Managers' Biggest Headache? Getting a Good Staff

By Marguerite Zientara
CW Staff

FRAMINGHAM, Mass. — Getting and keeping qualified personnel is the most prevalent problem in DP shops around the country.

Surveyed by *Computerworld*, DP managers were asked to name the three most pressing problems in their shops today and to explain how they plan to deal with them. The survey was mailed to 500 DP managers — representing all areas of the country and all sizes of installation — from CW's subscription list.

Of the 77 managers who responded, all but seven listed three separate answers, for a total of 224 replies. Even though personnel problems trailed hardware- and software-related problems in frequency of mention, they were by far the most frequently cited specific category (27 of 224 items, or 12%). Hardware and software problems, on the other hand, were nearly as diverse as they were numerous (hardware: 37 replies or 16.5%; software: 35 replies or 15.6%).

Conclusion: While DP managers continue to wrestle with a wide variety of individual hardware and software problems, many have

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Product Spotlight

Integrated FMS: A Look at 10

By Rita Shoor
CW Staff

The emergence of integrated financial management systems (FMS) offering data bases to which top managers have on-line inquiry capability is the most evident hallmark of financial application packages today.

Getting information to the user immediately rather than making him sort through the "tons of reports" generated in a totally batch environment is perceived as crucial by top vendors. True financial management is "judicious use of the means (specifically, money) at your disposal," explained Richard F. Carlsen, director of marketing for Informatics, Inc.'s Applications Products Division.

And "knowing where you stand today" is essential to achieving this type of control, he said. In the past, people "didn't know where they stood [financially] until two weeks after month-end."

The trend toward integration became evident when *Computerworld* interviewed nine vendors offering 10 IBM-compatible financial packages. IBM itself is represented by two offerings: its recently introduced Interactive Financial System (IFS), which operates under CICS/DOS/VS and DL/1 DOS/VS [CW, Jan. 19] and its Financial Management System for the OS/MVS environment.

The independent vendors interviewed by CW are the eight leading

(Continued on Page 10)

Honeywell Last Again

Magnuson Tops, Users Tell Datapro

By Tim Scannell
CW Staff

DELRAN, N.J. — Mainframes made by Magnuson Computer Systems Corp. came in first while machines from Honeywell, Inc. continued to finish a strong last when they were scored by users for overall satisfaction, according to the latest annual user ratings survey from Datapro Research Corp.

Magnuson, a relative newcomer to the tight and highly competitive "big machine" field, captured first place easily in the annual user ratings roundup as it beat out such mainframe heavyweights as IBM, Sperry Univac and Amdahl Corp. The company jumped from last year's second-place position to replace Amdahl as the No. 1 computer vendor.

Digital Equipment Corp. also advanced, leaping from third to second place.

A number of other computer makers included in the survey did not fare as well. Amdahl, which was last year's shining star, dropped about 13% in user popularity and was rated fifth out of a field of 10 companies. Control Data Corp., Univac and NCR Corp. also slid further down the ratings mountain, even though NCR fared a fraction better than it did in last year's survey.

Ironically, Honeywell is the only company that did not shift positions on Datapro's extensive chart. While ratings for the firm were consistent — it clocked in last both in 1980 and this year — the firm was actually rated lower in overall user satisfaction than it was in the last survey.

To arrive at its figures, Datapro interviewed people at 1,919 user sites with a total of 2,234 computer systems installed. The number of people and machines that took part in this year's survey was less than that of last year's, which included nearly 5% more sites and roughly 70% more installed systems.

As in last year's survey, users were also asked if they planned to replace their systems in 1981, if they would stick with the same vendor when

(Continued on Page 48)

Cincom Beefs Up Data Dictionary; Result: DCS

By Lois Paul
CW Staff

CINCINNATI — Cincom Systems, Inc.'s data dictionary will no longer stand alone now that four system development facilities have been integrated into the IBM-compatible software to form the Series 80 Data Control System (DCS).

Announced today, the elements of the Series 80 DCS are an on-line, interactive data dictionary with data entry and query facilities; a systems design facility, which enables the systems analyst to employ structured analysis and top-down design techniques; a software component, which turns IBM 3270 and compatible terminals into programmer workstations; and a centralized, standard security system.

The Series 80 DCS interactive dictionary contains information about entities and attributes and features

(Continued on Page 8)

NCC '81 Kicks Off Today

CHICAGO — A small city of 70,000 — populated by users and vendors from the U.S. and abroad — is expected when the doors of McCormick Place swing open this morning for the first day of the National Computer Conference — and the start of what President Ronald Reagan has proclaimed as National Computer Week.

Sponsored by the American Federation of Information Processing Societies (Afips), NCC '81 will feature more than 525 exhibiting companies in 2,300 booths within the 230,000 net square feet of exhibit area at McCormick Place.

The conference will kick off at a 10 a.m. plenary session when Marisa Bellisario, general manager of Italtel, will deliver a keynote speech entitled

(Continued on Page 9)

Look for the NCC Daily! *every morning. If it's not under the door of your hotel room, you can find the paper — offering 64 jam-packed pages of show information and Chicago happenings — in your hotel lobby or at the* Computerworld *booth on the exhibit floor.*

JAMES MARTIN **END USER'S GUIDE TO DATA BASE** **AND FOUR MORE IN DEPTHS INSIDE**

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Effective May 10

FCC OK's Private-Line, Wats Hike

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T has received Federal Communications Commission (FCC) permission to raise its private-line and Wats rates by 16%, effective next Sunday, May 10. A similar increase in rates for dial-up, long-distance services was deferred temporarily.

AT&T in February had proposed a 16.4% increase in its private-line rates [CW, Feb. 23], and the commission is still considering that request. This latest increase will add to the earlier one, and if both go into effect, private-line rates will rise 35%, said an AT&T spokesman.

The 16.4% private-line rate increase was proposed shortly after the FCC ordered AT&T to adopt a revised system of accounts which "substantially increased the level of costs allocated to private-line services," according to a phone company spokesman. Early last month, the commission increased AT&T's allowable rate of return from 10.5% to a range of 12.75% to 13%. That led to the second rate increase request, proposing to raise rates 16% for Message Telecommunications Service (MTS), that is, dial-up, long-distance service, Wats and private-line services.

On April 24, the FCC's common carrier bureau, acting on delegated authority from the commission, said rates for the latter two services could go up. But the bureau deferred the proposed MTS increase because its analysis had raised "substantial concerns" that increasing those rates 16% would "cause MTS services to earn more than a 12.75% rate of return."

AT&T must now demonstrate either that its proposed MTS increase will not raise the allowable rate of return above the FCC-imposed ceiling, or the phone company must ask for a smaller rate hike. The company has already announced that it will "demonstrate promptly" that the pending rates do not exceed the rate of return ceiling.

Objections Certain

Objections to the increases in private-line and Wats rates are certain. One likely approach is to appeal the bureau's decision to the full FCC.

Normally, when a tariff is increased, it becomes effective 90 days after being authorized. The new private-line and Wats rates, however, will become effective in less than 30 days if the common carrier bureau's order is implemented.

A spokesman for the Ad Hoc Telecommunications Users Committee, one of several groups opposing the increase, indicated his organization will argue that it wasn't necessary for the bureau to suspend the rules.

But the commission doesn't appear likely to buy that argument. In granting the phone company a 12.75% to 13% rate of return last month, it recognized that AT&T had an "urgent" need for "immediate" rate relief.

Western Union Proposes Rival For Postal Service's Ecom

NEW YORK — Western Union has introduced an electronic mail service for bulk mailers that will compete with the U.S. Postal Service's proposed Electronic Computer-Originated Mail (Ecom).

Prices for Western Union's Computer Letter Service will range from 40 cents each for monthly volumes of more than 50,000 letters to 90 cents for monthly volumes of 1,000 to 5,000 messages.

Subscribers can input messages via leased lines, dial-up connections or by mail.

At the destination end of the transmission path, Computer Letter Service will interconnect with the Postal Service; the messages, recorded on forms and encased in envelopes bearing the Western Union logo, will be delivered by postal carrier within 30 hours after input.

Among the initial users of the new service will be several major airlines and a large consumer products company, Western Union said. The service will complement Western Union's Mailgram service, which charges the user for each message and does not involve any quantity restrictions.

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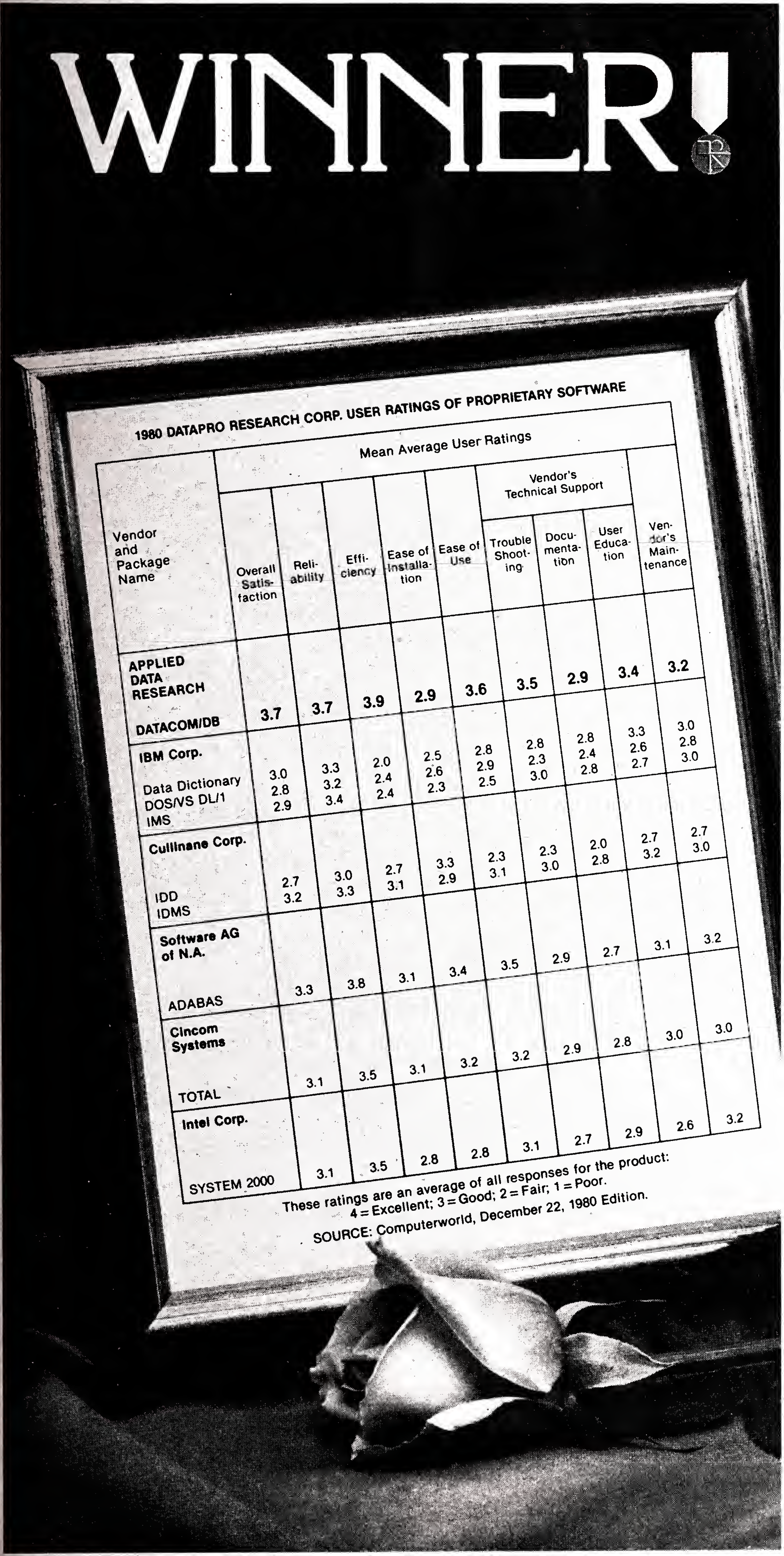

1980 DATAPRO RESEARCH CORP. USER RATINGS OF PROPRIETARY SOFTWARE

Vendor and Package Name	Mean Average User Ratings								
						Vendor's Technical Support			
	Overall Satisfaction	Reliability	Efficiency	Ease of Installation	Ease of Use	Trouble Shooting	Documentation	User Education	Vendor's Maintenance
APPLIED DATA RESEARCH									
DATACOM/DB	**3.7**	**3.7**	**3.9**	**2.9**	**3.6**	**3.5**	**2.9**	**3.4**	**3.2**
IBM Corp.									
Data Dictionary	3.0	3.3	2.0	2.5	2.8	2.8	2.8	3.3	3.0
DOS/VS DL/1	2.8	3.2	2.4	2.6	2.9	2.3	2.4	2.6	2.8
IMS	2.9	3.4	2.4	2.3	2.5	3.0	2.8	2.7	3.0
Cullinane Corp.									
IDD	2.7	3.0	2.7	3.3	2.3	2.3	2.0	2.7	2.7
IDMS	3.2	3.3	3.1	2.9	3.1	3.0	2.8	3.2	3.0
Software AG of N.A.									
ADABAS	3.3	3.8	3.1	3.4	3.5	2.9	2.7	3.1	3.2
Cincom Systems									
TOTAL	3.1	3.5	3.1	3.2	3.2	2.9	2.8	3.0	3.0
Intel Corp.									
SYSTEM 2000	3.1	3.5	2.8	2.8	3.1	2.7	2.9	2.6	3.2

These ratings are an average of all responses for the product:
4 = Excellent; 3 = Good; 2 = Fair; 1 = Poor.

SOURCE: Computerworld, December 22, 1980 Edition.

ADR'S DATACOM/DB™ took on all comers and beat them in virtually every Datapro category

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- ☐ Call from salesperson.
- ☐ DATACOM product literature.

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Computer

DG Net Architecture Made SNA-Compatible

By Brad Schultz
CW Staff

WESTBORO, Mass. — Data General Corp. last week revealed that its network architecture is compatible with the one from IBM, making DG's flagship 32-bit system a rival for IBM's 8100 and allowing its Eclipse systems to run as IBM 3274 and 3276 terminal controllers.

DG's X.25-compatible Xodiac architecture now fits IBM's Systems Network Architecture (SNA), which does not support X.25 in the U.S. Since X.25 is becoming a world standard for joining data terminal equipment to public data networks, its absence from the SNA fold poses problems for IBM customers that DG means to solve.

Several new software products, available within 90 to 120 days of order, implement the Xodiac extensions under DG's Advanced Operating System (AOS) for 16-bit systems and its AOS/Virtual Storage (AOS/VS) for 32-bit systems. According to a DG spokesman, the vendor's Eclipse MV/8000 system under AOS/VS can run with the revised Xodiac as an alternative to IBM 8100 and certain 4300s in a decentralized, IBM-hosted data network.

With DG/SNA, which figures as the most important of these new software products, IBM hosts treat Eclipse systems as if they were type 2 physical units (IBM jargon for cluster controllers). The basic DG/SNA module costs $8,000.

A companion package, SNA/3270, puts DG squarely in the IBM plug-compatible peripherals market with emulators for IBM's 3278 CRT terminal as well as the 3286 and 3289 printers.

And emulation of IBM's Synchronous Data Link Control (SDLC) protocol is given by the DG/SDLC package, which, like SNA/3270, costs $2,000. These initial license fees cover one year of DG's Software Subscription Service and 90 days of Comprehensive Support Services.

Emulator Interface

DG/SNA is said to provide an interface between users and DG-supplied terminal emulators as well as between users and programs they have written.

Other software to implement the Xodiac extensions includes what DG called Xodiac network management software (NMS) and separately packaged "software agents." The spokesman said NMS enhances Xodiac at two levels: the functional level, through which the user manipulates a remote system's resources, and the X.25 level, corresponding to the Consultative Committee on ITT's recommendation for passing data between terminal equipment and public data networks.

Software that tackles the functional level, including a security-enhancing File Transfer Agent, costs $7,500 in either AOS or AOS/VS versions. The X.25 software, which implements the bit-oriented High-Level Data Link Control (HDLC) protocol common to public data networks, costs $1,800.

At the X.25 level, DG offers support for Link-Access Procedure-Balanced mode. This mode reportedly reduces the amount of control information needed to transmit data, thus pruning the user's communications overhead.

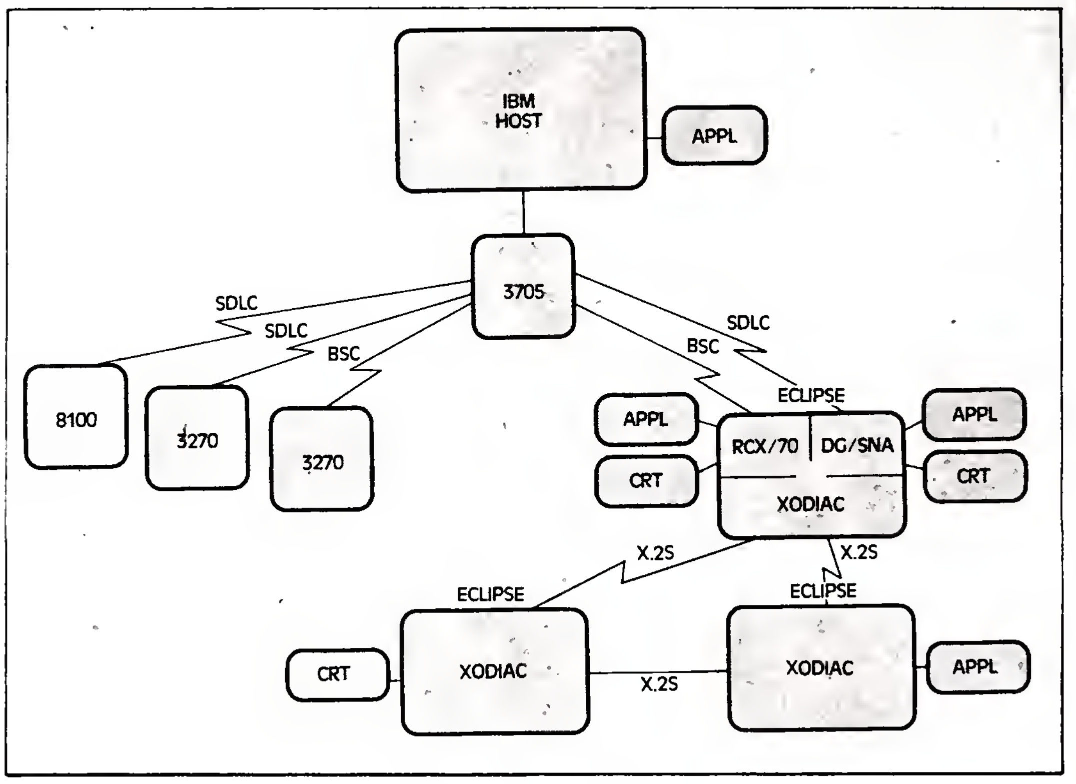
While NMS includes the File Transfer Agent, two other agents — the Remote Infos II Agent (RIA) and Remote Database Agent (RDA) — are sold separately for $1,575 apiece. RIA provides transparent access to DG's Infos II file management software on remote Eclipses, the spokesman explained. RDA reportedly provides remote access to DG's data base management software (DG/DBMS).

Finally, DG made all its communications products compatible with AOS/VS. This brings batch-oriented RJE 80 and Hasp II protocols to the MV/8000, although a spokesman said the main difference between the MV/8000 and IBM 4300s is that the former was designed for interactive DP, while the latter is batch-oriented.

The top 32-bit DG system, therefore, seems a tougher rival for 4300s with announcement that these RJE 80 and Hasp II packages are available for $1,838 and $2,100, respectively. And they are joined by a $5,775 package that delivers the bisynchronous RCX 70 (IBM 3270) protocol.

DG literature suggests that Eclipse systems need at least 512K bytes of main memory for service as SNA infiltrators. To support bit-level protocols, Eclipses will also require one of two special circuit boards.

DG's Information Systems Division is at 4400 Computer Drive, Westboro, Mass. 01581.



Xodiac Architecture

DG Enhances Software For Eclipse MV/8000

By Lois Paul
CW Staff

WESTBORO, Mass. — Data General Corp. last week announced it has beefed up the commercial software offerings for its top-of-the-line 32-bit system, the Eclipse MV/8000.

These offerings, in conjunction with the Xodiac revisions, are targeted toward strengthening DG's position in the superminicomputer arena.

The new offerings include 32-bit Cobol, RPG-II and APL programming languages that are available under the Advanced Operating System/ Virtual Storage (AOS/VS).

DG has added a remote access capability to its data base management system (DG/DBMS) and Infos II data management software.

The Proxi program generator and Sort/Merge utility also have been added to the MV/8000, rounding out the software offerings which compliment the 32-bit Basic, Fortran, PL/I and Swat debugging software currently available under AOS/VS.

DG also unveiled its Dataprep key-to-disc data entry package than runs under both AOS/VS and AOS systems software. It enables users to input data directly to a magnetic disk file using a DG Dasher terminal.

"With these products, Data General further underscores its commitment to the large-scale commercial users," according to Bob Kissach, marketing manager for data systems.

.On a compute-bound benchmark, the 32-bit Cobol reportedly operated up to twice as fast as 16-bit Cobol.

DG/DBMS, based on the 1978 Codasyl recommendations, supports processing and development for multiple on-line and batch Cobol or Fortran applications concurrently, Kissach said.

Query Facility

The Query facility provides users with a method of accessing the information from the data base without developing an application program or determining how to navigate DG/DBMS data structures.

The RPG-II language is used for report generation, file maintenance and data preparation in DP applications. The Proxi program generator is designed for application development for data entry, inquiry, file maintenance and report generation.

AOS/VS APL allows workspaces using up to 512M bytes of storage. "This lets users organize a large file as a single array and manipulate the entire array as opposed to manipulation of array segments," Kissach said.

AOS/VS APL may be used interactively for program development and execution or may be run in a batch mode for production runs where user intervention is not required. Up to 25 interactive APL terminals can be supported simultaneously. Kissach said the AOS/VS APL is compatible with IBM's APL.SV and VSAPL.

For present commercial MV/8000 users, 16-bit Cobol programs can be compiled on the 32-bit Cobol software without modification, DG claimed.

The Dataprep data entry package provides control of records, such as movement, deletion and insertion of records within a file. Dataprep software runs under one AOS or AOS/VS process controlling up to 12 Dasher displays.

The initial license fee for the software compiler packages runs $10,000 for Cobol, $4,000 for RPG-II and $12,000 for APL. The license fee is $18,000 for DG/DBMS, $2,625 for Infos II, $6,300 for Proxi Program Generator, $2,000 for Sort/Merge and $8,900 for Dataprep.

The software fees for the DG AOS/VS initial license includes installation, one-year Software Subscription Service, support and one training credit.

DG's Information Systems Division is located at 4400 Computer Drive, Westboro, Mass. 01581.

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DG's 32-Bit Software Products

Includes File Management System

Wang Eyes DDP Accounts, Adds 2200 Cobol

By Lois Paul
CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. has added Cobol for its 2200 line of small business systems, signaling the company's move to penetrate major accounts in the distributed data processing arena.

Wang 2200 Cobol is an interactive version of Cobol language that includes Ansi Level 1 features and is compatible with Wang VS Cobol, the vendor said. It includes incremental compilation and syntax checking.

Also provided with the Cobol are debugging tools that enable the programmer to stop program execution at a critical point to display, modify and trace the value of variables. The programmer also can step through a program one statement at a time and cross-reference data items, paragraph names and text strings.

Wang Basic-3, an enhanced version of Basic, is provided as a companion utility language for Cobol. The enhanced version of the 2200 Series MVP-LVP CPU reportedly can process Basic-3 and Cobol programs concurrently because Basic-3 is coresident with Cobol.

The Cobol operating system contains a file management system that facilitates the sharing of data files created by Basic-3 and Cobol, using buffer strategies to maximize performance.

The file management system supports sequential, relative and indexed files and random, sequential and dynamic access. Both fixed-length and variable-length records are allowed.

The 2200 series MVP/LVP CPU now can handle larger Cobol programs than other systems of comparable size, Sam Gagliano, product director for the 2200 systems, said. A 64K byte bank memory on the 2200 can handle 4,000- to 5,000-line Cobol programs, he added.

Another Cobol feature is print spooling, which optimizes printer usage by placing printer output in a disk file instead of sending it directly to a printer.

Programs written in Cobol may call subprograms written in either Cobol or Basic-3.

Enhanced features of Basic-3 include numeric functions and alphanumeric manipulation, a set of general-purpose statements and system commands and statements to control resources in a multiuser environment.

The language differences between Basic-2 and Basic-3 are mainly due to the changes in the file management system, the vendor said.

Ideas-2 Unveiled

Another product that was unveiled is Ideas-2, which, according to Winston Eaton, marketing manager for the 2200, is no longer a productivity tool, but essentially a code generator. The enhanced version of this utility software package enables users to design and maintain a data file, link screens, place algorithms and report it out, he explained. "Applications are 85% to 90% code-free," he said.

Ideas-2 is a self-documenting module that is always structured, regardless of how many programmers have been involved with coding, Eaton explained.

According to John Molitor, Wang's director of marketing, the company's large accounts for the Series 2200 involved primarily problem solving until a year ago.

Recently, there has been more of a movement into distributed data processing. "We have installed 500-plus units into a single company," Molitor said.

The most recent enhancements to the 2200 series took about two years to develop, Molitor said. "Now that distributed data processing has become pretty well defined, we saw an opportunity to penetrate major accounts, just as our word processing products have been successful in this area," he said.

According to Gagliano, there always has been a clear upgrade path for users of the Series 2200 systems. Their software investment has been fully compatible.

The enhanced software products will be demonstrated this week at NCC in Chicago.

Availability Dates

Wang 2200 Cobol will be available in September after beta site tests this summer. Basic-3 and Ideas-2 will be available in June. The expanded capability of the 2200 LVP is currently available.

According to Gagliano, Cobol and Basic-3 are available for $2,000 in an Option C package for current and new users of the 2200 Series. This includes Cobol, Basic, the file management system and the additional hardware necessary to support these in the 2200 Series.

Gagliano described the development as part of an entire effort to become "more compatible, not just with IBM, but with our own products.

"Wang products are higher into the hierarchy now. The goal is to complete the triangle," he said.

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Antitrust Chief Wants Courts to Handle AT&T

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Either Congress or the courts — but not both — should try to restructure the U.S. telecommunications industry, the new head of the Justice Department's Antitrust Division said last week.

"Why should we both be doing it simultaneously?" William F. Baxter, newly appointed assistant attorney general for antitrust, said in an appearance before a House Judiciary Subcommittee.

In a discussion touching on a number of topics, including the government's antitrust suits against AT&T and IBM, Baxter told the subcommittee "there is no good way to restructure" any industry.

Nevertheless, he told Subcommittee Chairman Rep. Peter Rodino (D-N.J.) no other institution has an advantage over the courts in this area. "The alternatives," he said, "are every bit as difficult . . . I really see no reason to make such a dramatic change in our practices."

Legislation Scuttled

Rodino's concern that congressional attempts to rewrite the 1934 Communications Act would hamper the Justice Department's AT&T suit scuttled the legislation in the last Congress.

Similar legislation has been reintroduced in the Senate. Sen. Robert Packwood (R-Ore.), the bill's chief sponsor, said last year he believes the AT&T antitrust litigation should be "settled legislatively" rather than by the courts, setting up a potential conflict between the two houses of Congress on the subject.

In opening the April 29 hearing, Rodino praised Baxter's resistance to recent Defense Department suggestions the AT&T case jeopardizes national defense by threatening the country's law enforcement decisions.

"I am pleased that you have vigorously defended the independence of the Antitrust Division in making its enforcement decision," Rodino told Baxter. "A letter from the Secretary of Defense critical of the Department of Justice's enforcement actions in a major antitrust proceeding could raise serious questions about the integrity of and independence of the division's law enforcement decisions."

Baxter replied he feels the Defense position on network integrity is understandable, but said "I was not convinced — I am not now convinced — that there is any inherent contradiction" in pursuing the case and maintaining that integrity.

Baxter said Defense views could be considered when the case is closer to completion. "Those concerns become relevant, if at all, only at the remedial stage" of the trial, he said. "They are not immediately germane to the issue of liability."

'Handicapping Winners'

On the general subject of Justice Department response to monopolistic activities, Baxter said there should be evidence of criminal wrongdoing before industry restructuring is sought. "I do not believe in handicapping winners so that other firms can keep up," he said.

Saying he is "an opponent of 'no-fault' monopoly approaches," Baxter said the Antitrust Division should ask, "What did this company do that a hard-nose, toe-to-toe competitor would not have done — what did they do wrong?"

Addressing subcommittee concerns about the amount of time the IBM and AT&T cases have taken, Baxter suggested the complexity of the cases made that unavoidable to a certain degree.

Nevertheless, he added, "I think it is attributable, at least in part, to a failure to fully prepare a case before the case is brought and a failure to articulate some theory of the case in the complaint at the outset."

Rodino suggested the department's inability to retain experienced trial attorneys has dragged out the court proceedings. Baxter agreed, but said there is probably no solution to the turnover problem in the long run, given the lack of salary flexibility in the government.

Concerning a possible out-of-court settlement of the AT&T cases, Rodino noted earlier movement in that direction. "The parties were poised," he said, asking Baxter if he now sees any chance for settlement.

"I think it's possible," Baxter replied. "I can assure you I would rather settle that case than litigate it." Saying he is sure AT&T feels the same way, he said "no opportunity to settle that case will be missed, but we're still far apart."

Asked if he believes treble damages should be awarded in antitrust cases, Baxter said he sees no justification for them unless a company engages in "secretive, conspiratorial behavior."

But in the case of "open activity" leading to significant market share, "the case for treble damages seems quite weak," he said.

Commenting on Justice opposition to efforts by AT&T competitors to enter judicial proceedings connected with the telephone company's request that a New Jersey court reconsider the 1956 Consent Decree, Baxter explained the department felt it could adequately represent the opposing viewpoint on its own.

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User Says System Defective

Judge Orders Mirabito to Testify in B800 Suit

By Tim Scannell
CW Staff

TWIN FALLS, Idaho — A district judge here has ordered Paul S. Mirabito, retired chairman of the board and present director of Burroughs Corp., to answer a number of written questions concerning the firm's lawsuit-riddled B800 computer system.

Judge Daniel Meehl asked the Detroit-based computer maker to answer interrogatories — formal questions that have to be answered under the direction of the court. The questions — not yet drafted — will be posed by Century Automotive Machines, a local firm that has filed suit against Burroughs for allegedly selling it a defective computer system.

In the formal request, Mirabito will be asked if he had any prior knowledge of alleged problems with the B800 computer, how Burroughs planned to cope with these problems and whether the system was intentionally oversold to the public, Gary Oliver, president of Century Automotive, said.

During the time of the B800 series' introductions in 1977 and 1978, Mirabito was president and chief operating officer and later chairman of the board and chief executive officer of the multimillion-dollar firm. He was succeeded last year as chief executive officer by W. Michael Blumenthal, who became the firm's chairman of the board on Jan. 1.

Question List

Century Automotive will send a list of questions to the firm sometime within the next few weeks, Oliver stated. After a reasonable period of time, Mirabito is required to answer these questions either through a personally filed deposition or by a written reply.

Century Automotive had originally requested that Mirabito travel from the company's Detroit headquarters and deliver a deposition in person. This idea was subsequently overturned by the district court, based on arguments by Burroughs attorneys and a signed affidavit that Mirabito knew nothing about the B800 sales or alleged user problems.

However, Meehl recently ruled that while Mirabito did not have to come to Twin Falls to answer Century Automotive's questions, he will have to reply in writing to questions that come to his office.

"The tack that these guys have been taking is that anybody who had any power — their managing agents, their board of directors, the chairman of the board — had no authority in the corporation," Oliver claimed. "The big question in my mind is just who the hell is morally responsible for the actions of that company."

About a month ago, Century Automotive moved a step forward in its legal proceedings against Burroughs when the court upheld a request asking Burroughs to turn over all documents related to the B800 computer and operating system software [CW, March 30]. The vendor has until June 12 to comply with the court order. Century Automotive filed suit against the computer maker nearly three years ago, charging that a B800 computer system sold to the firm never performed as promised.

Central to Century Automotive's interrogatory questions is a sworn affidavit given by a former partner of an accounting firm in Kalamazoo, Mich., also a B800 computer user.

In the affidavit, Chuck Mordyke stated that after repeated attempts to talk with Burroughs about problems he was having with the B800 — which was acquired because of its alleged time-sharing capabilities — he reportedly discovered Mirabito's unlisted telephone number and called the chairman of the board at his home late one Friday night in 1978.

What followed was a nine-minute telephone conversation between Mordyke and Mirabito, during which the unhappy B800 user threatened to release the unlisted number to other disgruntled users if the company did not do something.

Burroughs Admission

Early the following Monday morning, Burroughs invited Mordyke to Detroit to try and iron out his equipment troubles, the affidavit states. While Mordyke was there, Burroughs executives admitted that the B800 was never meant to work as a time-sharing system, Mordyke claimed, even though the system was sold to the Michigan accounting firm and to other companies as a system that could easily handle a number of users.

Because Mordyke pushed hard to acquire the computer for his firm — and was also responsible for its operational success — he was voted out as a partner soon after his return from Detroit.

Besides Mordyke's sworn affidavit, Century Automotive also has documented telephone records detailing the conversation between him and Mirabito, Oliver noted.

Although no trial date has yet been set, Oliver hopes to meet Burroughs in court sometime in October or November.

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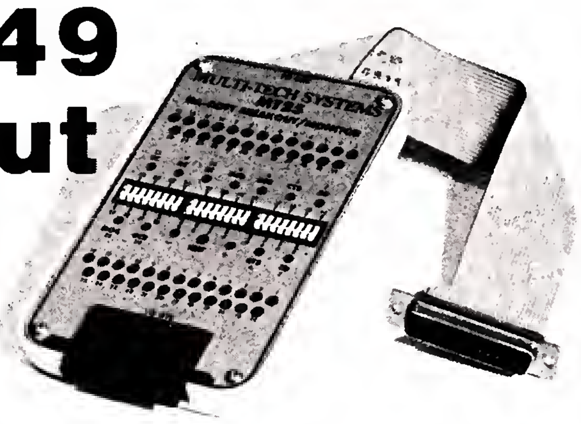

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Cincom Data Dictionary Forms Heart of Data Control System

(Continued from Page 1)

on-line data entry, which enables data and documentation for existing and new entities to be entered, validated and stored immediately.

Operating from an IBM 3270 or compatible terminal, the data entry facility provides interactive entry and maintenance of data. Default values are supplied for the majority of entered data fields, reducing the amount of keying required, the vendor said.

Data transactions may be batched or "staged" to help control change of the data dictionary. This feature is designed to ensure information consistency because all changes to the dictionary occur at one time. Results of data entry or dictionary maintenance reportedly can be viewed within minutes.

The interactive query facility provides a relational view query language which allows the user to define and operationally catalog extraction procedures and output formats interactively. It includes 25 cataloged query procedures for commonly extracted information. These may be modified by the user interactively to suit individual needs.

This facility also provides extraction of predefined hard-copy reports, or a subset of these, to be initiated from a terminal. In addition to the on-line initiation of hard-copy reports, Series 80 DCS provides the facility to generate formatted, volume reports for reference or documentation purposes.

Design Facility

The system design facility uses methodologies including structured analysis and top-down design to produce a working model or blueprint of the application system.

Using these techniques, the analyst creates a structured analysis schematic of the application system. From this, the analyst creates a model of logical data structures required to support the application and maps the logical model to the physical data base management system.

The third component of the Series 80 DCS is the data control system programmer workstation. This software facility enables programmers operating through IBM 3270 or compatible terminals to use a full-screen text-editing capability to prepare programs, test data, job control language (JCL) and documentation, the vendor said. The programmer reportedly also has access to a comprehensive DCS library system, a Pansophic Systems, Inc. Panvalet or Applied Data Research, Inc. Librarian library or any system source library.

Programs or any JCL stream may be submitted to the host operating system internal readers for compilation, testing and execution. Results may be returned to the DCS programmer work-station for immediate viewing and, if required, left in the operating system output queue for printing, according to the vendor.

Programmer Productivity

Cincom claimed programmer productivity is significantly enhanced by reducing the amount of coding, eliminating test turnaround delays and making changes and maintenance easier.

With regard to security, Series 80 DCS controls access to data through a password system maintained at both the file and element level. All files, data terminals and transactions are said to be protected by a transaction-level recovery system.

Series 80 DCS reportedly provides independence from CPU, operating system and disk type. Fully compatible support is provided for IBM 370 and higher level systems, Cincom said, adding that it provides complete compatibility for DOS/VS, DOS/VSE, VS1, SVS, MVS and MVS/SP. It is available for Series 80 Enciron/1, Cincom's on-line control monitor, and also as a stand-alone version, the vendor noted.

The purchase price for the DOS or OS interactive data dictionary is $29,500. The DPS or OS program generation facility and systems design facility each are priced at $10,000. Cincom Systems is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

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Getting, Retaining Staff Found Biggest Headache

(Continued from Page 1)

personnel problems in common.

"Finding entry-level qualified people" was the biggest headache of Keith Moes, DP Director for the Clatsop County Government in Astoria, Ore. "They expect to earn amounts equal [to those of] employees with three to four years' experience, but are unable to do the simple tasks of entry positions (programming)," he wrote.

How to solve the problem? "My only option is to hire people with experience, but it is extremely difficult for a small government installation to be competitive in today's market," Moes observed.

While capital was inevitably mentioned by the few government installations surveyed, commercial DPers also struggle with making jobs monetarily attractive to prospective employees. "Turnover due to salaries," "time and money to educate personnel" and "capital to finance hiring additional personnel" were typical personnel-oriented complaints.

The DP manager of a Western retail sporting goods outfit voiced a slightly different complaint: "Lack of qualified caring people" is the problem he faces. "Too many people are perhaps qualified, but want jobs and [do] not care about the organization."

Cures for the personnel headache included such solutions as importing people who are "dying to come to sunny Southern California," instituting career pathing to improve morale and positioning departments as high as possible (priority-wise) "so that when funds are available, I'll be able to get them."

Other solutions: "Keep jobs interesting and challenging; mid-year out-of-ordinary salary increases are unheard of here"; "try to train people from other areas of the organization for entry-level DP positions, then advance as they go"; and "planning education schedule well in advance to take advantage of closer sites to eliminate travel expenses."

Simple Solutions

For those installations with lots of money, the solution is more simple: "Be very competitive with salary and benefits," "higher salaries" and "use headhunters, offer flexible hours, high pay and excellent benefits."

Hardware, software and personnel were the most common problems mentioned by respondents — but they were not the only ones. Problems unique to individual installations were cited in 31 of the 224 replies (13.8%). Other complaints voiced — in descending order of frequency — included problems regarding management methods, users as the root of problems, financial resources and upper-management-related vexations.

Moving into the negligible percentages of total responses (less than 5%), managers cited staff resources, or the lack thereof; programming backlogs; productivity; and IBM- and maintenance-related problems.

NCC to See 'City' of 70,000

(Continued from Page 1)

"The Field of Telematics." Considered the highest ranking woman line executive in the computer industry worldwide, the former president of Olivetti Corp. of America will address the growing significance of telecommunications/data processing, in particular, the European approach and the positive impact on productivity in the office.

Reagan's director of the Office of Planning and Evaluation, Richard F. Beal, will be the second NCC keynoter. Beal will speak tomorrow at the noon plenary session.

W. Michael Blumenthal will speak at the Wednesday plenary session. Blumenthal, formerly president of Bendix International and U.S. Secretary of the Treasury from 1977 to 1979, now chairman of the board and chief executive officer of Burroughs Corp., will be introduced by Illinois's Gov. James R. Thompson, who has proclaimed the week of NCC as National Computer Week in Illinois.

A Conference Reception will be held from 6 p.m. to 8 p.m. tonight in the Grand Ballroom of the Conrad Hilton Hotel.

With the theme "Keys to Productivity," the four-day show will feature 109 program sessions and 21 Professional Development Seminars. It will cover the broad subject areas of hardware and architecture, network technology, capacity and performance analysis, software and information processing management.

Also covered will be education and societal issues, automating the office; computers at work; data base systems; and visuals, natural language processing and artificial intelligence.

The Personal Computing Festival will present sessions on professional and educational uses, business applications and language, and technical uses of personal computers.

Also featured will be the popular Science Film Theater. Three theaters will run continuously, showing films on computer technology. Ten hours of entertaining and informative films will cover such topics as computers and communications, computer graphics and the history of computing.

Wednesday will be Pioneer Day, celebrating the 30th anniversary of Univac I, the first commercial computer. In two sessions, several of the pioneers who worked on this achievement will discuss just how it happened.

As a bonus, a model of the Census Bureau's historic first computer will be on display in the Conference Registration area.

To make life easier for all attendees, conference management will again offer an International Visitors Center, free bus service, a message center and assistance for the handicapped.

Each full registrant will receive the hardbound copy of the *NCC Proceedings*. Personal Computing Festival attendees will receive *Proceedings* as well as *Personal Computing Digest*.

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- Do you use a sequential search when you should use a binary search?

If these questions give you an uneasy feeling because you're not sure, there's a book you should get right away. It's called *Structured ANS COBOL, Part 2: An Advanced Course*. It can teach you how to use COBOL the way the best programmers in the best COBOL shops use it.

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If all that sounds like a tall order for a $17.50 book, I guess it indicates how powerful I think this book is. In fact, as you will see later, I guarantee its effectiveness. So if you've never purchased a book by direct mail before, now's the time to start.

What does the book cover?

The object of this book is to teach you how to be the best COBOL programmer possible. So chapter 1 begins by teaching you practical methods of structured design, documentation, and coding that will have you developing programs better and faster than ever before.

The remaining chapters cover the language elements that are either misused or *not* used by the average COBOL programmer. For instance, chapter 2 shows how to code table-handling routines using indexes, the SET statement, and the SEARCH statement. Chapters 3 and 4 cover the COBOL language you need when you want to use the CALL and COPY libraries. Chapter 7 shows how to write COBOL sort or merge programs so they can be executed in a controlled way from start to finish. Chapter 9 shows how to process indexed files using (1) the 1968 IBM COBOL elements and (2) the 1974 standard COBOL elements. And there are also chapters on character manipulation and the debugging verbs.

Beyond the COBOL considerations, the emphasis in every chapter is on *practicality*. The table-handling chapter, for instance, doesn't just teach the ANS table-handling elements. It also explains why it's more efficient to index a table than to subscript it, when to use a binary search rather than a sequential search, and how to break complex, multilevel tables down into one- and two-level tables that are easier to handle.

Likewise, the chapters on the COPY and CALL libraries don't just explain the COPY and CALL statements. They also show how and when the libraries should be used in developing structured programs. The sort/merge chapter doesn't just present the COBOL SORT and MERGE verbs. It also shows alternate ways to sort or merge records that are processed by a COBOL program.

In short, you won't just learn advanced COBOL elements from this book. You'll also learn how to use these elements in the most efficient, most practical way possible.

If this is Part 2, what about Part 1?

Part 2: An Advanced Course is the second part of a two-part course in structured COBOL. *Part 1: A Course for Novices* is designed to teach a beginner the skills needed to become an entry-level programmer in industry. In terms of COBOL, this book teaches a professional subset that includes sequential file handling on tape or direct-access devices. And, like Part 2, Part 1 teaches practical, structured methods of design, documentation, and coding. So a beginner will learn how to develop structured COBOL programs right from the start.

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Product Spotlight

(Continued from Page 1)

suppliers of accounting software, according to the *Independent Packaged Software Reference Book* from International Data Corp. (IDC). They include Management Science America, Inc. (MSA), Software International Corp. (SI), On-Line Systems, Inc., McCormack & Dodge Corp. (M&D), Computeristics, Inc., Arthur Andersen & Co., Fortex Data Corp. and Informatics, Inc.

This group of independent vendors should be viewed as representative of FMS products — there are hundreds of packages actually available in this application area. It should also be stressed that financial management services offered by time-sharing vendors, turnkey systems, IBM-compatible packages targeted toward small business or minicomputer systems and industry-specific software products are not included in this overview.

The one notable exception to the vendors that offer a multiplicity of packages is Connecticut-based Computeristics. The firm was ranked fifth in sales of packaged accounting software by IDC, which based that ranking only on Computeristics' accounts receivable package, CustomAR.

Moreover, On-Line Systems is a sister company to United Computing Systems, Inc. (UCS). While UCS was specified in IDC's listing, On-Line Systems took over software for the commercial market in January, according to Mary Anne Best, director of marketing. UCS is now concentrating on scientific and engineering applications.

Most of the nine vendors interviewed offer several accounting functions with packages that feed into a general ledger (GL) system; five of the independents, together with IBM, offer some type of financial planning capability. This feature is often sold via a separate modeling package (see Page 71 for a report from Real Decisions Corp. on these products). However, several of the vendors opted to include some planning features in their GL packages.

The independent vendors' systems run under all OS- and DOS-type operating systems on hardware configurations including the 360, 370, 4300 and 30 series, and Cobol is the source language for the modules. While IBM's Financial Management System package is also written in Cobol, the DOS-oriented IFS is written in PL/I.

Many of the independent vendors' products also run on various non-IBM systems and some offer a package version geared toward the small business system environment.

Other FMS Trends

Besides integration, other general FMS trends include an increased emphasis on customer education and ease of use for the non-DP-oriented financial specialist. The design philosophy behind the financial modeling feature of M&D's GL/Plus, for example, was to "get DP out of it as much as possible," according to John Landry, vice-president of research and development.

Kay Faria, SI's manager of marketing communications, predicted that "customer education will be very important in the next few years" — a statement very much in line with the vendor's "sneak preview" for current GL customers of its Fiscal Decision Support System package (see story on Page 12).

One reason for the proliferation of FMS packages may be that few programmers and analysts are "wasting their time" at developing in-house software for basic accounting functions. "Most DP people don't consider these applications very glamorous," Larry Smart, director of MSA's Financial Management Division, maintained.

But, glamorous or not, information systems directors are advised by DP consultants not to regard the FMS as a panacea for all their financial application-related problems. Unless the requirements definition is properly done, "you wind up with the same problems that you normally have with [in-house] system develop," one specialist warned.

Wayne Smith, director of Quality Assurance and Business Systems for Applied Information Development, Inc., (AID) provided some confirmation from a slightly different angle.

People view FMS packages as if they are an "implementable capability" rather than one segment of the entire system life cycle. This tendency seems to be particularly apparent in large organizations, observed the consultant who has assisted clients with the installation of various financial software products.

While he conceded that in-house system development cost is replaced by the cost of the package itself, he estimated that this figure is actually a "relatively small percentage of the entire system cost."

CustomAR (Computeristics, Inc.)

Accounting Functions: Accounts receivable. Order entry, order processing and inventory control are handled by another package, Custom Order. This package operates in stand-alone mode or can interface with CustomAR.

Financial Planning Capabilities: None.

DBMS Interfaces: DL/1 (Custom Order only).

On-Line or Batch: Both. Custom Order described as "totally interactive."

Average Storage Requirement: 200K-300K bytes.

Non-IBM Host Systems: Univac 1100 series (CustomAR only).

Number of User Sites: CustomAR — About 100. Custom Order — 8.

Price: CustomAR — $60,000. Custom Order — $110,000.

Informatrix (Informatics, Inc.)

Described as a group of accounting packages that communicate with each other.

Accounting Functions: General ledger (GL), accounts payable, accounts receivable, order entry/inventory control (includes sales analysis), purchase order, travel expense/employee receivables. All of these functions are available as separate packages or modules.

Financial Planning Capabilities: Financial forecasting, cash management, regression analysis for high-level decision support available as part of the GL system.

DBMS Interfaces: IMS, Total

On-Line or Batch: Both.

Average Storage Requirement: 64K-128K bytes.

Non-IBM Host Systems: Any Cobol-supported minicomputer.

Number of User Sites: Approximately 500.

Price: GL — $25,000-$50,000; AP — $20,000-$30,000; order entry — $20,000-$25,000; purchase order — $10,000; travel expense — $25,000-$35,000; AR — Price not available because the package is currently being redone. "AR wasn't originally designed for on-line processing and it is an on-line application."

General Ledger (GL) And Financial Reporting System (Software International Corp.)

Package does not work with fixed-block architecture under either OS or DOS-type operating systems.

Accounting Functions: Accounts payable, accounts receivable, payroll/personnel, fixed assets. All are available as separate packages.

Financial Planning Capabilities: "Financial modeling software package currently under development."

DBMS Interfaces: IMS, Integrated Data Management System (IDMS) and DL/1 for the GL package. Total interface for GL and accounts payable.

On-Line or Batch: On-line data entry and inquiry for GL. Batch updating and reporting.

Average Storage Requirement: Not available.

Non-IBM Host Systems: Digital Equipment Corp. Decsystem-10 and 20, Burroughs Corp. Models 1700 through 4800, Univac 90/30 and 1100 systems, ICL, Inc. systems and various minicomputer systems.

Number of User Sites: About 1,500 worldwide for GL only. About 3,500 have at least one package within SI's FMS structure.

Price: GL — $40,000-$58,000; accounts payable — $19,000-$30,000; accounts receivable — $32,000-$35,000; payroll/personnel — $20,000-$22,000; fixed assets — $24,000-$26,000; all prices are approximate and based on a 25-year lease.

GL/Plus (McCormack & Dodge Corp.)

Accounting Functions: Accounts payable as a separate package that feeds into the general ledger GL/Plus system. Accounts receivable and payroll packages are in development.

Financial Planning Capabilities: Feature including the Fast modeling language is a module attached to the GL/Plus package. Allows executives and financial analysts to feed the results of a forecasting run directly into GL/Plus budget analysis. Described as "automation of the 13-column spread sheet."

DBMS Interfaces: IMS, DL/1, Interactive Data Management System.

On-Line or Batch: Both.

Average Storage Requirement: Approximately 150K bytes.

Non-IBM Host Systems: Honeywell, Inc., Burroughs Corp., Univac — "the larger mainframes."

Number of User Sites: About 230.

Price: $45,000-$65,000 license fee.

Commercial Accounts Receivable Management System (C-Arms)

Property Information & Management System (Pims) (Fortex Data Corp.)

Like Computeristics, Inc., Fortex does not offer a General Ledger System that other packages feed into.

Accounting Functions: Accounts receivable (C-Arms); fixed assets (Pims).

Financial Planning Capabilities: "Not really."

DBMS Interfaces: IMS, DL/1, Total, Integrated Data Management System.

On-Line or Batch: Both (C-Arms); batch only (Pims).

Average Storage Requirement: C-Arms on-line processing — 100K-250K bytes; batch processing — 350K-700K bytes. Pims — 175K-375K bytes.

Non-IBM Host Systems: None.

Number of User Sites: C-Arms — about 125 worldwide. Pims — about 95.

Price: C-Arms — $55,000-$125,000, depending on whether on-line or batch and on the required DBMS and/or TP monitor interface; Pims — $22,500-$41,000, depending on options selected.

Planning, Implementation Still Difficult

Users Likely to Purchase, Not Develop, FMS

By Rita Shoor
CW Staff

ATLANTA — "Few organizations can justify developing financial management systems (FMS) from scratch," according to Stephan A. Conn, a consultant with Ernst & Whinney.

Although an FMS "means different things to different people" and its definition varies greatly depending on organization size, the odds favor buying financial software rather than developing it in-house, Conn said.

This does not mean that staff responsibilities are confined to selecting the right package and paying for it. Obtaining, installing and converting to a new system is a difficult and expensive task, he warned members of Management Science America, Inc.'s (MSA) Future user group at a conference here.

Conn's presentation on "Planning the Implementation of Financial Management Systems" began by emphasizing the need for a clear user requirements definition. This is usually generated before any package is selected and should be utilized by the systems analyst to construct a "conceptual system design." The result of this process will be the package evaluation criteria, he said.

He also recommended developing a detailed design before acquiring a package. While this step may seem unnecessary, he maintained that it enabled the purchaser to be specific when discussing his firm's requirements with software vendors.

"Don't give up too quickly on the old system," he cautioned. The prospective software buyer should ascertain that all end-user procedures in the current financial system are addressed and corrected, if necessary, before acquiring a new package. "The new system won't automatically correct them (user procedures)," Conn noted.

After acquisition comes implementation — the most difficult step in the entire process, according to the FMS specialist.

Product Spotlight

System implementation involves a variety of people including vendors, end users, in-house systems technicians and, possibly, outside consultants. All of these individuals must view the project from a standpoint of meeting structure and performance requirements if the implementation is to be successful, he said.

At least 5% to 10% of the total implementation time should be spent in the planning segment, Conn said. "Implementation is a complex and dangerous process and you can't plan too much for it," he warned.

The consultant subdivided planning into 13 specific subtasks:

- Assessment of implementation process needs. Determines specific resources required to support the system's implementation.
- Skills inventory. Involves adding the names of specific people to the list of requirements defined in the preceding task.
- Appraisal to resources to project scope. Prepare a summary of the items to be corrected or accomplished in order to prevent perceived system bottlenecks. A written summary should be sent to appropriate management personnel.
- Project team assembly/briefing. All in-house project members should be people who are respected in their departments. Conn also sug-

(Continued on Page 12)

The Portfolio (On-Line Systems, Inc.)

All packages are available as part of Portfolio and are also offered as stand-alone systems.

Accounting Functions: General ledger, accounts payable, accounts receivable, fixed assets. A "large, separate" purchase order module is also available that is tied to the AP package. An on-line-cash application offering a real-time update that is tied to the AR system is expected to be released the first week in May 1980.

Financial Planning Capabilities: Foresight package. Sold as a separate product, it is end-user-oriented and On-Line Systems offers four days of on-site training with the package.

DBMS Interfaces: None.

On-Line or Batch: On-line data entry and inquiry. Batch update.

Average Storage Requirement: "Dependent upon client's transaction volume."

Non-IBM Host Systems: Univac 1100 and System 80. Several minicomputer systems.

Number of User Sites: About 1,200 sites with one or more package.

Price: Portfolio accounting systems sell as a total financial package from between $115,000 to $190,000, depending on optional on-line and report-writing capabilities. Each system may be purchased separately.

Financial Management System (FMS) (IBM)

Operates under OS/MVS on 370/148 and up to and including the 3081 processor.

Accounting Functions: General ledger and financial reporting system.

Financial Planning Capabilities: None within FMS. However, this package interfaces with IBM's Plancode financial modeling package.

DBMS Interfaces: IMS /DB.

On-line or Batch: Both.

Average Storage Requirements: 30K-100K bytes.

Non-IBM Host Systems: Not available.

Number of User Sites: Not available.

Price: $1,750 per month.

Interactive Financial System (IFS) (IBM)

Operates under CICS/DOS/VS or DL/1 DOS/VS.

Hardware configurations include 370/115 through 370/168, Series 30 and 4300 processors.

Accounting Functions: Program products are labeled ISS 1,2,3 and 4. Include postings and general ledger functions at Level 1, profit and loss, balance sheet and financial status reports at Level 2, accounts payable and accounts receivable at Level 3, and payment processing for AP at Level 4.

Financial Planning Capabilites: None.

DBMS Interfaces: DL/1.

On-Line or Batch: Both.

Average Storage Requirement: Each IFS program product uses 30K bytes of real storage and interactive mode and 130K bytes in batch mode.

Non-IBM Host Systems: Not available.

Number of User Sites: Not available.

Price: Monthly leases are $621 for IFS 1, $138 for IFS 2, $276 for IFS 3 and $207 for IFS 4.

Finpac (Arthur Andersen & Co.)

A financial planning and control system that performs general accounting including responsibility reporting.

Accounting Functions: General ledger, accounts payable (AP), accounts receivable (AR). AP and AR can be utilized separately, but are not considered to be stand-alone operations. Finpac offers "extensive budgeting capability for fixed and flexible budgeting" and also handles cost allocation.

Financial Planning Capabilities: None.

DBMS Interfaces: Although Finpac does not interface directly with IMS, it can be modified to do so. All I/O processing is centrally located in a "few modules."

On-Line or Batch: Primarily batch processing.

Average Storage Requirement: Largest program without overlay requires 350K bytes — with overlay, 120K bytes.

Non-IBM Host Systems: Univac 9030, Honeywell, Inc. Level 88, ICL, Inc. mid-size computers. Several minicomputer systems.

Number of User Sites: Approximately 130 worldwide.

Price: $20,000. This package is only available to Arthur Andersen clients after the consulting firm and the client have determined the product's "usefulness and application within that client's business environment."

General Ledger (GL) System (Management Science America, Inc.)

MSA's GL System forms the hub of its FMS. The other MSA accounting packages feed into it.

Accounting Functions: Accounts payable, accounts receivable, inventory control, fixed assets, payroll and personnel. All of these can be utilized as stand-alone systems as well as interfacing directly with the GL System.

Financial Planning Capabilities: Financial Forecasting and Modeling System. This is a separate package composed of a data base, an English-type modeling language and a reporting function. Can access the GL data base and feed data back into it. Oriented to financial analysts or planners. MSA offers both on-site classes and sessions in its Atlanta offices and estimated "about two days" for an end user to become capable of building "basic models."

DBMS Interfaces: OS environment — IMS, Adabas, Total, Integrated Data Management System (IDMS), DOS environment — DL/1, Adabas.

On-Line or Batch: Both — on-line data capture and inquiry — no real-time update.

Average Storage Requirement: Approximately 250K bytes. This can vary depending on the operating system and file access method used.

Non-IBM Host Systems: Burroughs Corp. medium and large systems, NCR Corp. Century and Criterion systems, Honeywell, Inc. Level 66 computer, Univac 1100 series.

Number of User Sites: Approximately 1,100 world-wide for the GL system alone. Around 6,500 sites have one or more of the financial packages.

Price: General ledger — $34,000-$90,000; accounts payable — $28,000-$46,000; accounts receivable — $60,000-$90,000 (offers on-line real-time update); inventory control — $23,000-$52,000; fixed assets — $26,000-$32,000; payroll — $39,000-$75,000; personnel — $34,000-$149,000 (can include up to seven additional modules besides the basic system); modeling/forecasting — $35,000-$40,000; variance depends on selected options, data base management system and inclusion of industry-specific modules.

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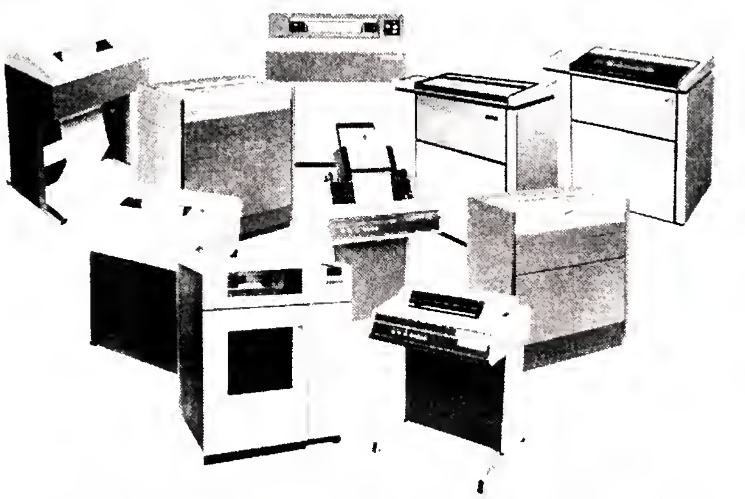

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SI Unveils Integrated FMS For IBM, HP Mainframes

By Rita Shoor
CW Staff

ANDOVER, Mass. — Software International Corp. (SI) has announced a totally integrated on-line financial software system for commercial users of IBM and Hewlett-Packard Co. mainframes.

The Fiscal Decision Support System (DSS) is available under either OS or DOS with CICS. It also runs on the HP 3000.

The package is the result of a partnership between SI and the Coopers & Lybrand public accounting firm. Fiscal DSS has been available in the municipal sector for more than a year, according to Kay Faria, manager of marketing communications; it has now been adapted for business and commercial use, she explained during a sneak preview for current users of SI's general ledger package.

Indicative of a general trend toward integrated systems for financial software (see story on Page 1). SI's Fiscal DSS "welds general ledger, accounts payable and purchase order control into a single on-line system," explained William G. Watson, the firm's president .

Fiscal DSS allows financial software users to "integrate their most important accounting functions into a shared data base," Watson continued. A single transaction generates a full audit trail from release of purchase order through general ledger and maximizes the speed, accuracy and convenience of CRT inquiry and data entry, he claimed.

SI is often associated with the small business system market, possibly because of the publicity received when the company formed a separate Small Business System (SBS) Division about three years ago. Maintaining that upon its formation this division "took off," Faria acknowledged that SI hadn't planned things that way.

SI "started out on IBM mainframes," she said. And, Fiscal DSS reflects the commitment to these larger installations because the package was designed to run on the IBM 360 and 370 as well as on the 4300 and 30 series machines, including the 3080. Included among Fiscal DSS capabilities are:

- Purchase order management: The package will not authorize payment unless the purchase order, receiving/acceptance document and the invoice match or an authorized user overrides the expected requirements.
- Liability management: The system allows payment dates to be scheduled in accordance with predefined user standards to optimize allowable vendor discounts and to plan cash flow.
- General ledger detail management: Includes full transaction editing, double-entry control, complete audit controls and conventional journal entry processing.
- Allocation management: Reportedly allows accountants to avoid repetitive calculations to identify apportionment over different accounts or time periods.
- Budget management: Was reportedly designed to support the budgetary process at all organizational levels "from senior management to section supervisors."
- Security/Audit Control: Includes auditor-approved account and transaction validation, verification and control totals and authority keys to prohibit system use by unauthorized personnel.

With a projected Sept. 1 availability, long-term lease prices are expected to range from $75,000 for the HP 3000 version to $125,000 for the IBM OS/DOS/CICS version, SI said from Elm Square in Andover, Mass. 01810.

Odds Favor Users' Buying FMS

(Continued from Page 11)

gested a letter from top management be sent to each team member that reaffirmed their participation in the project.

- Inventory of unavailable resource time. Make a list of all vacations, training time, travel requirements, operations scheduling and any other factors that may negatively impact the implementation schedule.
- Application responsibility assignments. Assign and brief a specific person and a backup to serve as coordinator for each major application.
- Initialize an implementation journal. A chronological file of all system implementation documents can be a great help if the implementation is not successful, Conn said.
- Assemble project timetables. Use an implementation management checklist and get all project team members to review it and agree to it.
- Assemble software deliverables schedule. Include specific systems, program names and application functions. The vendors and in-house programmers should review this schedule and sign off on it. Include modification estimates.
- Assemble training schedule. Develop a user training plan that is documented in a formal schedule. All user departments should receive a copy of the completed schedule.
- Develop application systems responsibilities. Assign the proper responsibilities to the in-house staff, vendor or consulting representative for data base/transaction definition, conversion, procedure development and acceptance testing.
- Assign user interfaces for applications systems tests. The coordinator should assign the user personnel to each application test/review phase of the implementation.
- Assess the value of available documentation. Collect copies of all documentation from both a procedures and an operations standpoint in order to identify how and what to modify, add or replace.

It is essential to maintain project momentum to ensure that management apathy does not develop, he continued. The implementation director should also keep in mind that the system must become part of the organization if it is to be successful.

While "this integration is extremely difficult," it is very important — particularly for an FMS since "financial management pervades the entire organization," Conn observed.

Agrees With Niosh Study

FDA Report Finds CRT Radiation Levels Safe

By Ann Dooley
CW Staff

WASHINGTON, D.C. — The Food and Drug Administration (FDA) has cleared CRTs of emitting harmful radiation in an FDA report due to be released today.

The FDA report follows hard on the heels of a study by the National Institute for Occupational Safety and Health (Niosh) which unequivocally denounced the idea that CRTs can be a radiation danger to users [CW, April 13].

The FDA's clean bill of health was given after that agency's Bureau of Radiological Health examined 125 units under laboratory conditions for a variety of ionizing and nonionizing radiation emissions.

The CRTs, which are used by an estimated seven million American workers, were shown to "emit little or no harmful radiation under normal operating conditions" and the emissions that were detectable were "well below any existing national and international standards," according to the FDA.

Currently, there are no standards specifying how much radiation a terminal may emit, so comparisons are usually drawn between terminals and television sets, many of which use the same screens. Fluorescent lights emit more visible and ultraviolet light than terminals, and space heaters give off more infrared radiation, the government agency said.

Microwave radiation, which at high levels is associated with cataracts, was "more than 100 times below the maximum level allowed under exposure guidelines set by the American National Standards Institute," the report indicated.

The tests were conducted at the FDA's Winchester Engineering and Analytical Center in Winchester, Mass. Of the 45 known manufacturers of CRTs, 31 terminal manufacturers voluntarily participated in the research. In all, 125 CRTs were tested for X-rays and 34 for other kinds of radiation. Eight of the 125 units tested for X-ray emmission were found to be exceeding the standards for television sets. The eight were either taken off the market or readjusted.

Maine Bill To Cover CRT Use

AUGUSTA, Maine — In a first-in-the-nation bill, the state legislature here is considering passage of an act to protect CRT users from possible health hazards caused by the terminals in their work place.

While it seems unlikely the bill will pass the state Senate, bringing the issue to people's attention will be a successful beginning, according to the bill's sponsor, State Rep. Edith Beaulieu, (D-Portland).

A member of the Portland Newspaper Guild, Beaulieu drafted the legislation after learning of the recent findings of a study by the National Institute for Occupational Safety and Health (Niosh), which indicated that stress and certain health problems were related to CRT use [CW, April 13]. Beaulieu's bill follows many of the Niosh-recommended guidelines for CRT use, including regular rest periods or alternate work, annual paid eye examinations and the distribution of hazard prevention material to all employees.

The bill will be presented in the next several weeks, according to Beaulieu, who noted that whatever its fate, it will "introduce it as a legitimate health and safety issue." If an employee complains to the Bureau of Labor, which will then have to go in and investigate — "then we will have come 100% from nothing," she stated.

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Opel Sees IBM Branching Into Personal Computing, Robotics, Biomedical Marts

John R. Opel, IBM president, addresses stockholders.

By **Tom Henkel**
CW Staff

KANSAS CITY, Mo. — Computer systems will still be IBM's main focus, but the firm plans to extend its reach into personal computing, robotics and biomedical services, according to President and Chief Executive Officer John R. Opel.

Speaking before 1,154 stockholders at IBM's annual meeting here, Opel said IBM will release at least one processor aimed at the personal computing market. He declined, however, to say how soon IBM plans to make such an announcement. Industry analysts have predicted IBM is on the brink of announcing a processor aimed at the low-end business and home computing markets, and that such an announcement could come as early as this year.

Opel also said IBM may make a play for the robotics industry. While he admitted IBM currently does not have a robotics-type product, Opel intimated one may be announced. He noted IBM currently has internal robotics systems, but he declined to say how soon such a product would be available.

On the mechanical side of IBM's product line, Opel said IBM plans to make unspecified enhancements to its biomedical line of products, which currently includes two blood processing machines and an electrocardiograph machine.

Stock Prices

While Opel said IBM may be expanding into new areas, he also said internal expansion will level off over the next few years. IBM added about four million square feet of laboratory space during 1980 and is committed to doubling that expansion. However, once that is completed, Opel said, IBM will slow its internal expansion in efforts to boost stockholders' dividends, currently 86 cents per share.

"Our stock price has been a disappointment. The performance of IBM through the '70s was impressive by any classic measurement of business. We tripled our revenue, we tripled our earnings and we did it with only a 30% increase in employees. The stock price, however, stayed about constant as the price earnings ratio declined. We are as disappointed with this turn of events as anyone. We think our stock is undervalued," Opel said.

In addition to the cutback in internal expansion, Opel pointed to the IBM retail outlets in Philadelphia, Baltimore and San Francicso; the National Marketing Center; new channels of distribution (that is, distribution in the mass market and quantity discounts); and the IBM Credit Corporation as ways of increasing revenues and potentially boosting dividends.

In response to antitrust litigation, Opel said the Justice Department's 12-year case has gone on long enough. "I think it fair to say the law suits belong to the past decade," he said.

In regular business, the stockholders voted overwhelmingly to elect 22 IBM-sanctioned board members and to defeat five stockholder proposals, the most notable being the ongoing fight between IBM and stockholders representing various religious and human rights organizations who have recommended IBM ban sales to South Africa and the Soviet Union because of alledged human rights violations in those countries. Stockholders also voted to approve an IBM proposal to extend the employee stock purchase plan for another five years.

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Xerox Unveils Ethernet Desktop Workstation

By Bob Johnson
CW New York Bureau

NEW YORK — Xerox Corp. last week announced a professional desktop workstation that incorporates computing, text editing, graphics creation and communications functions. The workstation was developed for use in Xerox's Ethernet local-area network.

Billed as the cornerstone of the company's marketing strategy for the office automation industry, the 8101 Star is geared for "the business professional whose main job is to create, interpret and manage information and distribute the results to others," according to David E. Liddle, vice-president of the Xerox office products division.

The basic workstation includes a split-screen or two-page bit-map desktop display; an 8000S processor with 192K-byte 16-bit main memory with a 10M-byte Winchester disk and a 1M-byte floppy; and an electronic pointing device called a "mouse." Including software, the system sells for $16,595 or leases for $695 per month under a one-year contract.

The Star is the latest addition to the company's 8000 series of network system products introduced last November and the first of four major announcements scheduled for 1981, the company said. It is intended to fill a gap in the company's Ethernet network by adding a workstation capability which, with other network equipment, gives the user control of the preparation, composition and distribution of a finished product.

The system can perform a variety of functions including information storage and retrieval, document printing, graphics creation and electronic mail distribution to local and remote users via Ethernet, the company said.

'Mouse' Pointer

These functions are carried out by the use of a "mouse" pointer and iconic symbols displayed on the screen. Xerox developed these symbols to resemble familiar office equipment, such as filing cabinets, and chose them in place of traditional typewriter command keys because they are easy for operators to use, the company said.

To execute most of the system's functions, the operator moves the mouse and points to one of the icons. The operator then presses one of four keys for the desired function — move, delete, copy and properties.

The system can also produce shapes, grids, frames, shades and lines, all of which can be moved or enlarged on the screen. The unsophisticated user thus becomes his own typesetter and graphics artist, Xerox said.

"We're dealing with professionals who prefer pointing and selecting to typing explicit commands," Liddle said.

Many of the Star's functions, although impressive, are not new, according to industry observers. Its two unique features are its iconic symbols and its graphics capabilities, which are lacking in machines from other manufacturers.

Learning to operate Star is relatively simple, Xerox said. Basic functions can be learned in about 20 minutes, and a good working knowledge can be acquired in less than four hours.

First deliveries of Star will begin in 32 metropolitan areas around Sept. 1, Xerox said.

Geisco Offers Quik-Comm Commercially

ROCKVILLE, Md. — General Electric Information Services Co. (Geisco) is now offering the electronic mail system it has used internally for more than four years.

Quik-Comm is a commercial system for moving correspondence, reports and data among dispersed sites. Traveling executives need only have a terminal to receive Quik-Comm messages, which may be filed for reference, routed to multiple addresses, edited or left for future action, Geisco explained.

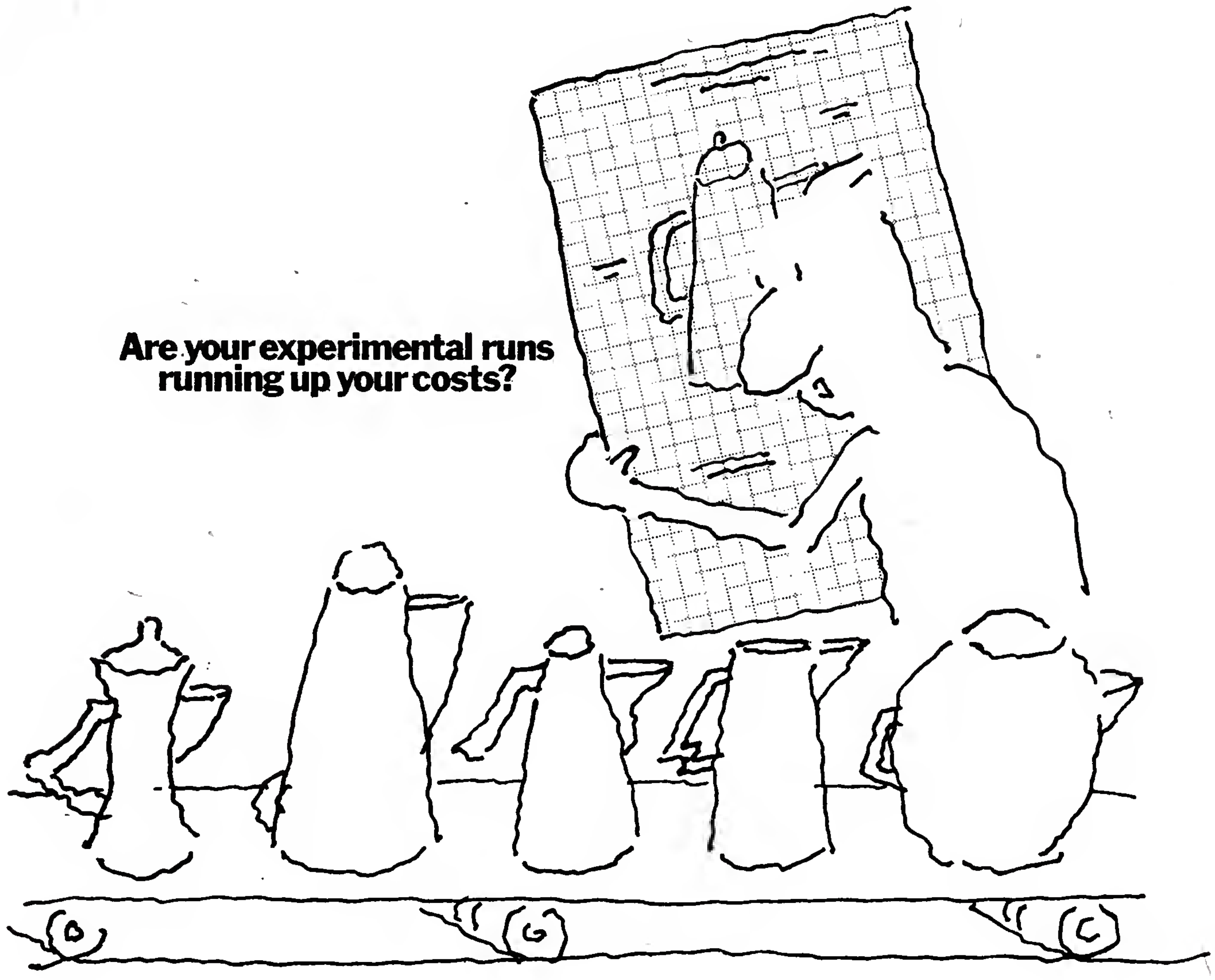
Quik-Comm depends on Geisco's Mark III service network. Mark III is available virtually around the clock, seven days a week, a spokesman said.

Local telephone access is available in more than 400 domestic and 200 foreign locations, he added. And users may also link up via public data networks.

Another spokesman said Quik-Comm offers more communications security than rival electronic mail systems and gives users more control over routing of documents in a large organization. Quik-Comm training was said to take less than an hour under normal circumstances because the system responds to "simple English language commands."

With Quik-Comm, cost per message ranges between $1 and $1.50, the Geisco source noted. Typical applications were said to include: price change reporting, policy change reporting, communication of competitive data, sales reporting, manufacturing production reporting and communication of urgent messages.

Geisco is headquartered at 401 N. Washington St., Rockville, Md. 20850.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Dilemma of Systems Management Explored

By Bruce Hoard
CW Staff

CHICAGO — In a personal interview during a Deltak, Inc. training conference here last week, independent consultant and ITT Director of Education Thomas D. Lutz described the dilemma of systems management.

Part of the problem relates to the fact that systems people are forced into management roles because they covet the perquisites of power associated with management, but are unable to realize them in nonmanagement positions, Lutz explained.

"We keep forcing technicians to become people directors," he said.

If they were not compelled to seek out positions they did not naturally desire, "75%" of the technicians who do so would devote themselves to technical excellence, the member of IBM's systems research institute claimed.

The way to keep them happy in their technical roles is to support them there, he added. That means giving them the secretaries, word processors and documentation they want.

Colleges are filling the managerial gap by turning out MBA recipients and other business-oriented graduates with the talents and ability to manage DPers on all levels, Lutz noted.

"I strongly believe that a good business head who understands the role of systems in an organization becomes a better systems organizer than a technician who has come up through the ranks," he commented.

"If you talked to the pure technician, he would disagree with me," he added.

Despite the widespread and notorious management problems plaguing systems departments, recognition of those problems is least likely to be by systems people, who are too immersed in their work to see what is happening around them.

Asked how he would advise programmers breaking into the profession, he recommended they spend as much time as possible learning the business side of their companies so they might be prepared to fill a management role if called upon to do so in the future.

Deltak Unveils Training Aids In Multimedia

CHICAGO — Deltak, Inc. unveiled two computer-enhanced multimedia training aids, designed to reduce student training time and tutorial training time and cost, at the company's annual training conference here last week.

Micro/Deltavision and IIS/Deltavision reduce student training time by substituting a computer for interaction with a tutor, a spokesman said.

Deltavision will be integrated into approximately 50 of the vendor's 900 technical courses by 1985, but current course offerings will remain available in their present form.

Micro/Deltavision delivers instruction through videotape, audiotape, text and an Apple Computer, Inc. Apple II microcomputer with 48K bytes of memory.

Although there is a rental option, Deltak is selling all the hardware needed to run Micro/Deltavision for those who do not already have it. That includes the Apple II and a video tape recorder. The price for that configuration runs between $3,500 and $4,000.

IIS/Deltavision also uses text, videotape, and audiotape to deliver instruction. However, it uses an IBM 3270 terminal linked to an IBM host, such as 370, 30 series and 4300 model mainframes. The automated portions of the course are presented via IBM's interactive instructional system (IIS).

The product will be available in limited modules by November.

The company is charging a double price for the products, meaning a user who now pays $50 a month for courseware will be paying $100 for the computer-enhanced version.

Deltak is located at 1220 Kensington Road, Oak Brook, Ill. 60521.

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Combines Application Software, DBMS

'CIS/IDMS' Pays Off for First User, Vendor

By Rita Shoor
CW Staff

HARTFORD, Conn. — Combining application software with its data base management system (DBMS) has paid off for both Cullinane Database Systems, Inc. and Hartford National Bank here.

The bank's reward is a savings of an estimated 10 man-years of system development time; for the vendor, it's an indication that its efforts at DBMS/applications software integration seem to be working.

Hartford National is reportedly the first organization to have installed the recently announced Customer Information System/Integrated Data Management System (CIS/IDMS) duo [CW, April 20]. The bank purchased the software package almost concurrently, citing the availability of CIS as a "key factor" in its IDMS decision.

Functional Capabilities

"We had been looking at all the major data base vendors," Tom Anderson, vice-president for systems planning and development, said. "We were very impressed with the functional capabilities of CIS and Cullinane's intention to expand its banking application portfolio."

John Cullinane, president of the software firm, had projected this expansion into the applications market and announced the decision to integrate applications packages with IDMS in the fall [CW, Oct. 20].

Hartford is actually involved with Cullinane in co-developing the package, according to a spokesman. The software vendor acquired rights to CIS in July. It was installed in test mode at Hartford National later the same month.

CIS "closely approximates" the Customer Information File (CIF) that the bank had been developing in-house but "writing our own [system] was like trying to develop an entire DBMS," according to Anderson. "We estimate that it would have taken 10 man-years for us to develop a system like CIS using non-data base technology," he continued.

More Responsive

While CIS is similar in concept to other CIF systems that are common to the banking industry, IDMS makes the package more responsive than other CIFs, he said. "Most banks use conventional file management . . . [but] CIS uses the networking features available under IDMS to greatly increase cross-referencing capabilities," Anderson maintained.

Demand deposit accounts (DDA), savings accounts, certificates of deposit, installment loans, Visa, Master Card and Hartford National's own automated teller machine IDcard are among the application systems supported by CIS.

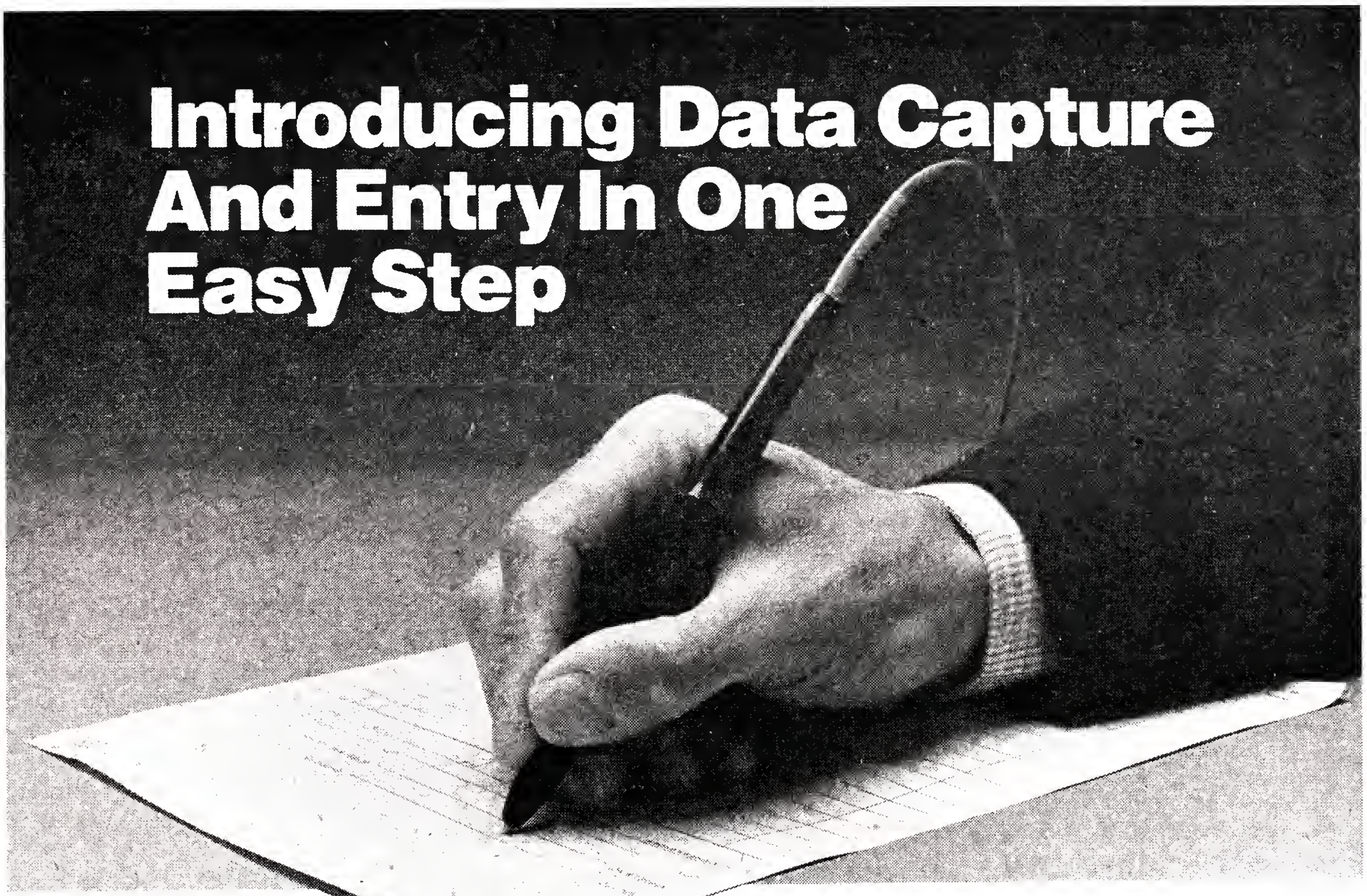
"The system can interface with these independent applications without conversion aids," Anderson said, and IDMS allows communication among the various files. Thus, Hartford National customers can have multiple accounts and addresses, customers can be tied to each other and to multiple accounts and accounts can be related to transactions, he explained.

"Because of the relationships that can be maintained with IDMS, we can structure our data base to reflect an accurate image of how we conduct business," Anderson said.

Stressing that IDMS "simplified access to the data base," Anderson pointed out that most CIF systems do not offer any means of data base access.

Ease of use also figured largely in the decision to go with CIS, he said. The system supposedly requires no formal knowledge of either computers or terminal query language since it is menu-driven. "Entry into the system is easy and practically

(Continued on Page 18)



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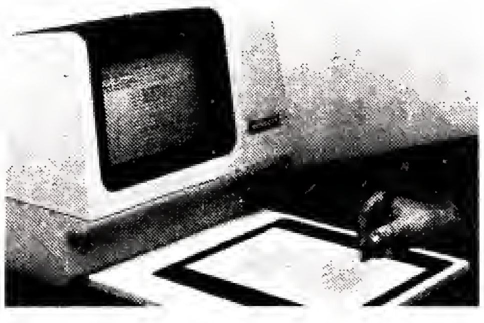

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Court Rejects Attempts to Keep Telpak Alive

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Supreme Court has rejected attempts by Telpak users to keep the service in operation despite an adverse ruling by the Federal Communications Commission (FCC), subsequently upheld by the circuit court of appeals here.

The high court declined, without comment, to consider petitions for review filed by the Department of Justice — representing federal government Telpak users — Aeronautical Radio, Inc. (Arinc) and the Air Transport Association (ATA). One more petition — from General Electric Co. — remains to be disposed of, but it is generally expected to be turned down.

If that happens and Telpak is finally terminated, it will end a battle that began more than 20 years ago. First the FCC, and later AT&T, tried to kill the service. The commission said Telpak rates were anticompetitive.

Then, when the agency tried to reduce this problem by requiring Telpak bulk discounts to be offered to all users through resale and sharing arrangements, the phone company decided not to continue offering the service. Telpak continued, however, to existing customers, while the battle dragged on in the courts.

Much of the debate was over whether the users had been denied a full hearing.

Datacomm Briefs

Senate Fight Brewing Over '34 Act Rewrite

WASHINGTON, D.C. — Another jurisdictional fight was developing in Congress last week over rewrite of the 1934 Communications Act.

Early last month, Sen. Robert Packwood (R-Ore.), chairman of the Senate Commerce Committee, along with three other Republican members, introduced the latest rewrite bill, S. 898. Sen. Strom Thurmond (R-S.C.), chairman of the Judiciary Committee, has now asked for "sequential referral" of the legislation after Commerce completes work on it — and before the measure goes to the Senate Floor.

Earlier, Thurmond made a similar request regarding S. 271, a bill that would repeal Section 222 of the Communications Act and allow Western Union to offer international communication services. Packwood has declined this latter request, so it is considered likely he will do the same regarding S. 898

At press time, a Hill source reported that negotiations concerning both requests were "under way." He added that "it's a little bit like the coal operators and the miners," a reference to an acrimonious and possibly intractable labor dispute also under way in Washington at the moment.

Mix of Software, DBMS Pays Off

(Continued from Page 17)

fail-safe as security functions are defined by the individual users," Anderson noted.

"It comes about as close to being self-explanatory as an on-line system can," he claimed. "We feel this is an essential ingredient in a system which will interface with many non-DP employees and, ultimately, [with] the bank's customers."

The product provides multiple security features such as user password recognition and restricted access codes that are essential in a banking environment.

Its reporting capability is "completely automatic," Anderson said. A daily audit journal records both "before" and "after" images of each on-line update performed throughout the day. The system is updated every morning. Tellers are informed of any unusual activity through a memo posting facility.

The greatest time-saver for Hartford National is the system's "combine customer" capability, according to Vincent Zujewski, manager of data administration.

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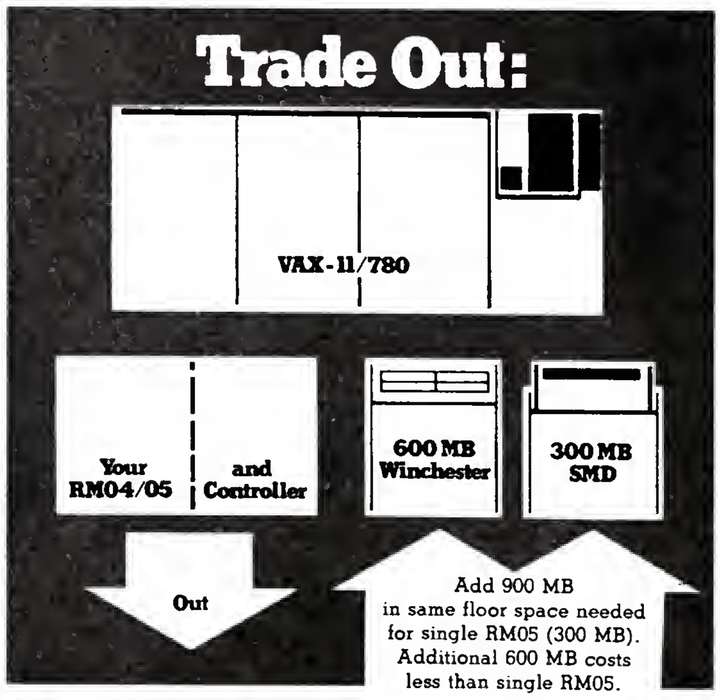
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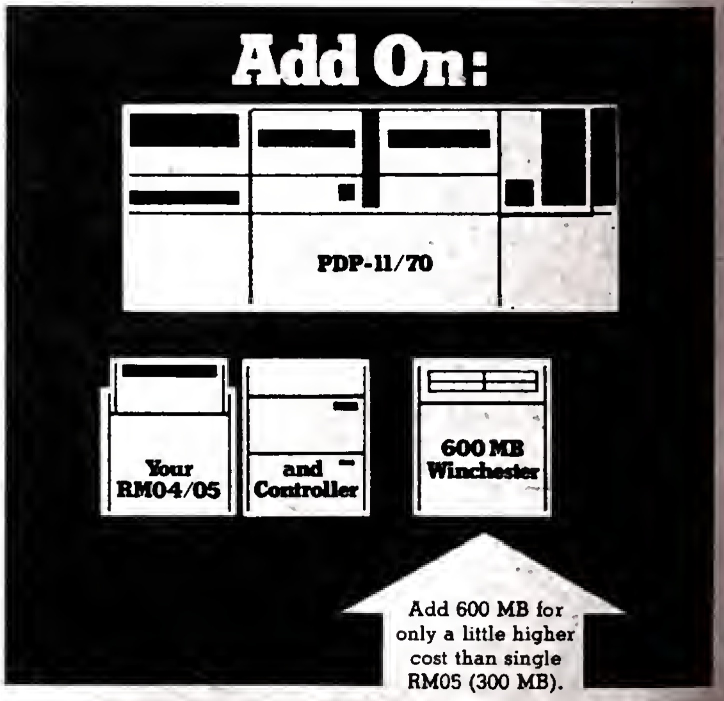
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Focus Now on Canada

Britain, France Agree on Videotex Standard

By Phil Hirsch
CW Washington Bureau

ARLINGTON, Va. — A common videotex/teletext standard that would make Britain's Prestel and France's Antiope systems compatible has been negotiated by telecommunications officials of the two countries.

Although primarily designed to prevent destructive competition within Europe, the agreement has significant implications for the U.S., particularly if Canada also signs up. And efforts to bring in the Canadians have already begun — or will begin shortly — according to Roy Bright, manager of the Antiope development program. Bright was interviewed here shortly after addressing "Viewtex '81", a conference on videotex/teletext technology.

Canada, Britain, and France are now competing vigorously to get their systems accepted in the U.S., but the concerns of prospective customers about incompatibility are a major stumbling block. Adoption of the new standard could reduce that obstacle significantly.

The standard was negotiated within Cept, an association of European telecommunications authorities, and it will be announced officially in June at a Cept meeting in Sweden, Bright said. West Germany, as well as France and England, is a party to the compact, he added.

Basically, the agreement encompasses a standard code for describing alphanumeric and graphic symbols displayed on a TV screen connected to a videotex/teletext channel. It excludes several enhancements Britain and France have introduced, or announced, in the past several months — such as dynamic redefinable character sets (DRCS), animation and photographic displays. Standardization of these "attributes" is planned later, Bright said.

Asked what changes would be needed in Prestel and Antiope decoders to bring them into compliance with the new specification, Bright said they would be "minor."

According to another source, however, who works for a U.S. organization deeply involved in videotex/teletext, the differences between Prestel and Antiope "are not minor." One or both countries will have to make "significant changes" in their present display coding schemes to support a common specification.

According to this source, "the big question is who has given up what." He also believes that "while a British-French standard is interesting, and may have some effect on the U.S. market, a Canadian-French-British standard would be really dramatic and would have far more impact."

As CW reported last week, AT&T has developed a coding scheme for videotex displays that is based on Canada's Telidon system — thereby giving that country a significant assist in its current competitive battle with Britain and France. As a result, Canadian interest in international videotex standards probably has waned.

Other Developments

Bright mentioned the Cept agreement at the end of a talk in which he also reported that:

- Tests of a French-developed "smart" credit card, containing an imbedded microprocessor chip, will be conducted this year in four French cities. The card reportedly is almost completely immune to counterfeiting.
- A battle between French newspaper publishers and the French telephone administration over the latter's plans to offer an on-line Yellow Pages service has produced an agreement barring the administration from displaying information that changes more often than once a year. Also, the "electronic directory" terminals that display Yellow Pages will not be allowed to access the teleshopping information supplied by "Teletel," a related videotex service.
- Tymshare, Inc. has agreed to buy 100,000 French electronic directory terminals, following similar moves by GTE/Telenet, Inc. and The Source.

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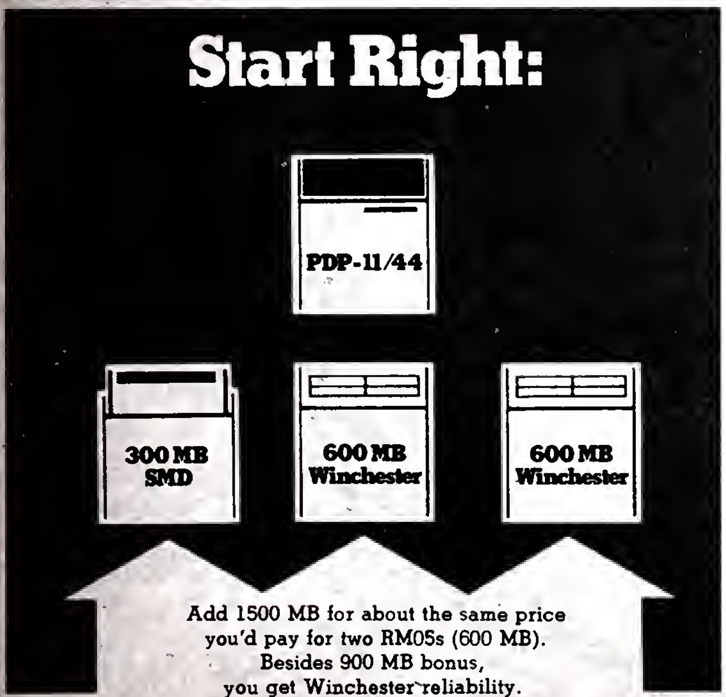
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Amendment to Privacy Act Proposed

Delinquent Federal Debtors Face Disclosure

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Government loan deadbeats whose names have been safely tucked away in federal computers under the protection of the Privacy Act face loss of that delinquency haven under legislation quickly working its way through Congress.

The bill, being heavily pushed by the administration, would amend the Privacy Act to make it easier for federal agencies to disclose to commercial credit bureaus the names of people who are delinquent or have defaulted.

The idea behind the Debt Collection Act, which could be cleared for President Reagan's signature by early summer, is that people will be more likely to pay off federal loans if they know nonpayment may affect their credit ratings in the private sector.

"We live in a world of credit transactions," House Government Operations Committee Chairman Rep. Jack Brooks (D-Texas) said last week, discussing the bill.

"People who are unable to establish a good credit rating are severely restricted in their range of choices and activities and in their ability to participate in our marketplace economy," Brooks said last Monday in a statement to a House subcommittee considering the legislation.

The problems of government debt collection have come under increased scrutiny over the last few years and have resulted in several legislative proposals.

Partially Cleared

The present proposal has already been cleared for full Government Operations Committee in the House and, according to committee staff, could get final approval by June 1. There is also concurrent activity in the Senate.

Uncollected federal debts are a considerable embarrassment to agencies. According to the Office of Management and Budget (OMB), more than $25 billion owed to the government as of Sept. 30, 1979 was either delinquent or in default.

An additional $8.4 billion in loans was in some form of rescheduled or stretchedout status because of borrowers' inability to pay, according to OMB. In fiscal 1979 over $1 billion in bad debts was written off and an additional $6.3 billion is expected to be written off.

Some outstanding loans may never be collected. Some federal loan programs are directed at near-poverty level groups of citizens who are obvious bad credit risks to begin with. Other outstanding debts may be so small that it would not be cost-effective to try very hard to collect them.

Much of the outstanding federal debt is associated with taxes and the Internal Revenue Service (IRS) has developed computer upgrade proposals to help it

(Continued on Page 21)

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Journal Compiles Data on State Privacy Laws

WASHINGTON, D.C. — The 1981 *Compilation of State and Federal Privacy Laws* is now available from "Privacy Journal," an independent monthly newsletter published here.

This year's compilation includes new sections on computer crime, insurance, mailing lists and telephone solicitation, reflecting new trends in state legislatures around the country, according to Journal publisher Robert Ellis Smith.

In addition, the *Compilation's* section on employment has expanded to include eight states that permit an employee to inspect his or her own records. In all, "Privacy Journal" has added more than 80 new privacy laws to the book, 15 of them passed in 1980.

The book describes and cites nearly 500 statutes and includes texts of representative laws regarding arrest records, bank records, computer crime, credit, criminal justice information systems and employment.

Other categories include insurance and mailing lists.

The 80-page *Compilation* costs $16 from "Privacy Journal," P.O. Box 8844, Washington, D.C. 20003.

Federal Debtors Face Disclosure

(Continued from Page 20)

collect more tax monies.

OMB last week directed all agencies to begin formal debt management programs, which include development of debt information systems to better keep track of the problem. Among other things, the administration is also proposing more use of Social Security numbers to check on federal borrowers and more use of IRS address information to help agencies find defaulters.

Once the legislation is passed, agencies could provide computer tapes of bad debt information to the few large national credit information services, such as the Associated Credit Bureaus, Inc., which has a computer services subsidiary serving 1,800 credit bureaus across the country. The organization has already expressed its support.

Credit Bureaus

Credit bureaus are not presently interested in maintaining federal debt information because, according to a Justice Department interpretation, it would bring them under the provisions of the 1974 Privacy Act.

Already subject to the restrictions of the Fair Credit Reporting Act, credit bureaus do not want another layer of federal regulations imposed on them. The debt collection legislation would lift that burden.

One House staffer working on the legislation described the privacy implications of the legislation as "pretty minimal," noting that, if not for the Justice interpretation, disclosure of the debtor information would probably already be considered fair use of the agency information under the law provisions of the privacy law.

Significant Difference?

Although the administration is counting on the legislation to help raise government revenues, it is not clear how quickly the bill could make a significant difference.

The bill would not mandate disclosure, so agencies lacking the computer facilities theoretically would not have to make the disclosures. The level of agency activity under the legislation would be up to the administration.

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Urbis Study Finds City Computing Rebuilding

By Brad Schultz
CW Staff

IRVINE, Calif. — Local government computing entered its fourth historical stage, Reassessment and Consolidation, in the mid-1970s, according to the Urban Information Systems (Urbis) Research Group here at the Public Policy Research Organization (PPRO).

This stage may end in a few years, but technological and political factors make the outcome unclear, Urbis said after on-site investigations of DP in 42 U.S. cities. The PPRO scientists identified three earlier stages in the forthcoming *Computers and Politics* [CW, April 27].

The Introduction and Conquest stage began in the 1950s, when the finance department gained the city's first computer and, with it, enhanced influence over other agencies. But the latter slowly got wise to the political value of computing during Experimentation and Expansion, which began in the mid-1960s, and local government computing decentralized as these users experimented with second-generation mainframes.

As the technology leaped forward, users fought fiercely for resources during the third stage, Competition and Regulation, begun in the late-1960s and early-1970s. An "information elite" of planners, analysts and managers saw the political value of data, not just computer, resources, leading the highest ranking officials to brace for a takeover by these wielders of "unfathomable" computer-generated analyses.

But the takeover never happened, as the elite spent their resources on attacking each other, while the technology raced ahead so fast that a "computer elite" arose as the only people available to comprehend it.

Skirmishes among the information elite and its tension with the computer elite led to regulation by special boards and some new involvement in computing by local governments' top officials.

Now experiencing the fourth stage, Reassessment and Consolidation, U.S. cities and counties must decide how to redistribute computing resources, Urbis said in *Computers and Politics.*

Complicating Factors

Two technological factors complicate this predicament: the advent of data base technology, which promises to give top officials immediate access to a wide range of data resources, and the proliferation of minicomputers, which allow many user departments to establish DP operations outside direct control by city hall.

Data base technology thus opens opportunities for centralization of local government DP, while minicomputers could decentralize DP even further, Urbis noted. Besides working to the advantage of a city's top officials, data base technology and allied concepts of "information management" are more attractive to department and groups that primarily use data rather than provide it, the researchers added.

According to Urbis, "department participants seem to be organizing along 'class' lines in the debate about integrated data bases. The 'computing have-nots' have joined the 'data have-nots,' top management and the computing department in favor of integrated systems that would consolidate the totality of data in the government and give everyone equal access to the data."

However, "Data providers, who also are major computer users, are concerned about the loss of control over their data," Urbis pointed out. And data providers worry about "the additional costs they might have to bear in

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In Reassessment and Consolidation Stage

order to collect data for others' information needs, and the misuse of data through lack of understanding."

Integrated data bases entail having all the local government's computer-stored data identified; treated as belonging in any number of data bases; organized for use in many different ways by different users; and stored in a number of physical data bases, ensuring availability for unanticipated as well as expected applications.

This means, Urbis explained, that data would be separated from the processes and organizations from which it originated. Those who now originate data valuable to various local government departments therefore stand to lose prestige and influence should integrated data bases spread access privileges.

This is the final article in a seven-part series on how computing affects local government. The series is based on soon-to-be-published research conducted by the Public Policy Research Organization's Urban Information Systems Research Group.

Another political consequence of integrated data bases is that people skilled in using data will benefit more than those who simply own data, Urbis observed. The information elite has such skills, whereas the expertise of the computer elite lies more in supporting machines and software that hold or provide data.

The centralizing effects of data base technology will be mitigated somewhat by the decentralizing effects of minicomputers, Urbis indicated, but the opposing trends may seesaw in relative strength according to economic pressures and the political acumen of concerned parties.

Fiscal Crisis

As to the political factors shaping the Reassessment and Consolidation stage of local government computing, reactions to the nation's urban fiscal crisis will probably figure as most important.

"Some critics cite computing as a contributor to the fiscal crisis of local government," Urbis remarked, "as the costs of computing personnel and software continue to escalate, and the expected savings from computing are not evident.

"In short, the failure of computing to achieve clear and widespread cost savings creates a great deal of uncertainty over its future development in an era of increasing public concern over the growth and expense of local government," the PPRO researchers asserted.

Contrasting the four historical stages, Urbis estimated that the present Reassessment and Consolidation stage has greatest potential for power shifts in the nation's cities and counties.

In time, these shifts may well benefit established power coalitions, partly because they now sense what is at stake as computing develops, but also because they are data users rather than providers. "The use of information now becomes paramount," Urbis concluded.

Articles in this series on local government computing summarize portions of Computers and Politics, *a book by James N. Danziger, William H. Dutton, Rob Kling and Kenneth L. Kraemer to be published by Columbia University Press, 562 W. 113 St., New York, N.Y. 10025.*

Computers and Politics *is the second book from the Public Policy Research Organization's (PPRO) Urban Information Systems (Urbis) Research Group based on the* Urbis *study of DP at 42 U.S. cities. The first book,* The Management of Information Systems *by Kraemer, Dutton and Alana Northrop was published by Columbia University Press this year.*

PPRO is an institute of the University of California at Irvine. For more information on Urbis projects, contact Kraemer c/o PPRO, University of California, Irvine, Calif. 92717.

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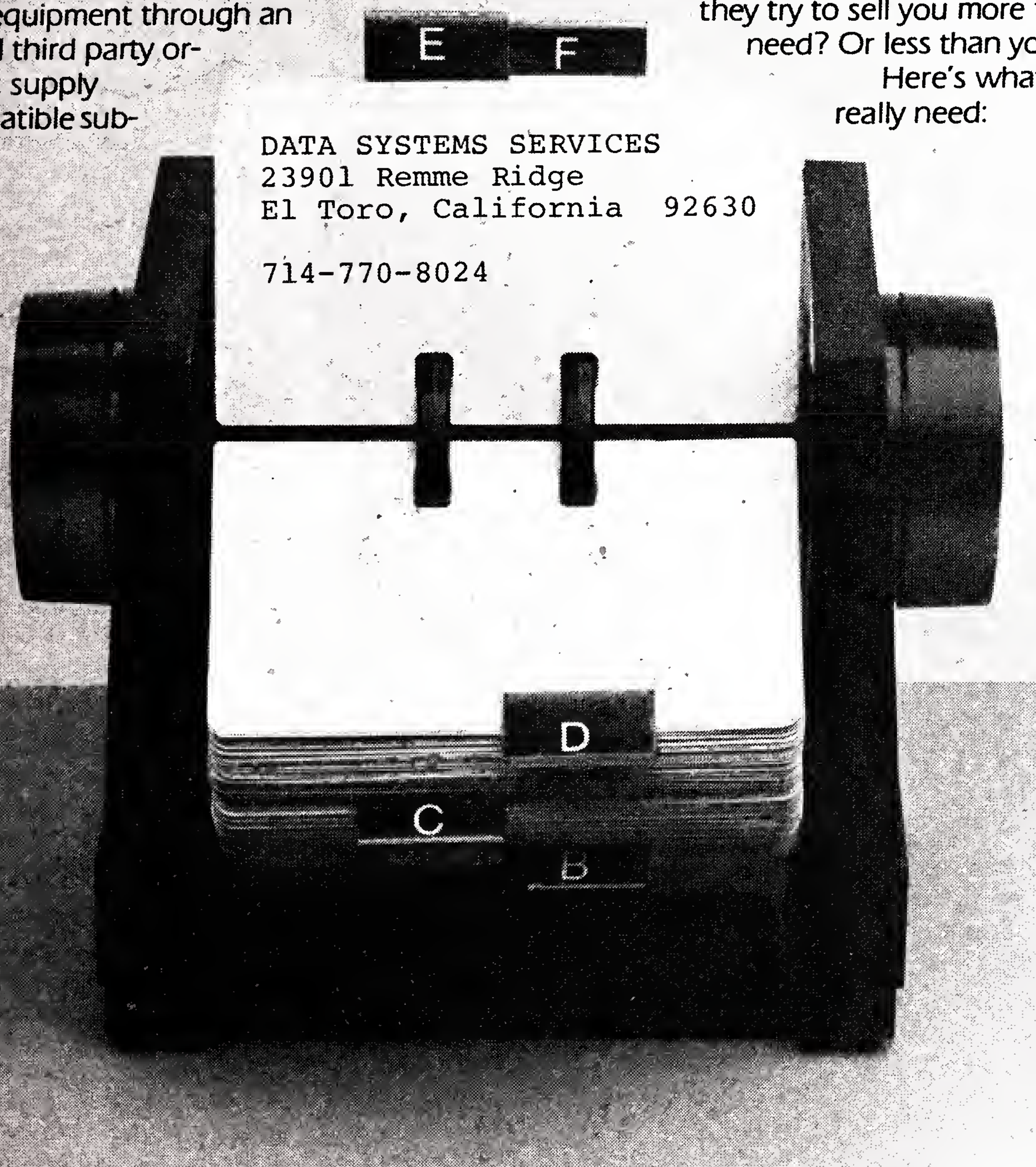

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Managers on the Move

Ivan K. Szathmary

Peter Blozis

Harvey R. Clements

IVAN K. SZATHMARY has been named senior vice-president of Information and Administrative Systems at the Great Atlantic & Pacific Tea Co., Inc. (A&P) in Montvale, N.J.

Prior to joining A&P, Szathmary was associated with the Tengleman Group in West Germany and the Nestle Co.

His educational background includes an M.S. in industrial engineering from the Technical University of Czechoslovakia and a Ph.D. in computer sciences from the University of Lausanne, Switzerland.

•••

PETER BLOZIS has been appointed corporate director of information services at Harte-Hanks Communications, Inc., San Antonio, Texas. He will oversee operations of the corporate computer department and work with key line and staff managers in developing a five-year comprehensive strategy for meeting the computer needs of all Harte-Hanks companies.

Before joining Harte-Hanks, Blozis was vice-president of management information services at H.J. Wilson Co., Inc. and spent 11 years in DP management positions at Xerox Corp.

Blozis holds a bachelor's degree in Computer Science from Purdue University and an M.B.A. from the University of Rochester.

•••

HARVEY R. CLEMENTS has recently assumed the role of coordinator of subsidiary data processing services at LDBrinkman/West Coast, Mr. Gatti's and Brinkcraft, all LDB Corp. subsidiaries. He will be headquartered at the firm's master distribution center in Irving, Texas.

During his 20-year career with LDBrinkman, Clements has worked in the sales department, order and service department, as Houston office manager and vice-president.

Clements has served as director of the Irving Jaycees, director of the Six Flags DPMA and on the Cedar Hill Citizens Advisory council.

•••

EVELYN S. WILK has been named a manager in the management information consulting division of Arthur Andersen & Co., with firmwide responsibilities in the firm's office automation systems including the planning, design, implementation and support of word processing and office automation systems.

Wilk has been active in the word processing field for a number of years, having served as manager of word processing in a major Chicago bank, in-house consultant and researcher for one vendor.

Wilk earned an M.B.A. from the University of Chicago.

•••

DAVID P. ABERNETHY has been appointed director of data processing at C.A. Roberts Co. in Franklin Park, Ill. He will now be responsible for all management information systems, computer programming, operations and on-line inventory systems for the 66-year-old tubing company.

Abernethy is a newcomer to the Roberts organization, but brings to his post more than 15-years experience in systems and information processing with such Chicago area companies as Intercraft Industries, Sealing Specialists and, most recently, the Wilton Corp.

Abernethy was born and raised in Chicago. He attended DePaul Acade-

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Managers on the Move

Evelyn S. Wilk

David P. Abernethy

Joel Johnson

William E. Eager

my, received an associates degree in management at Aurora College and a B.S degree in economics from DePaul University.

•••

JOEL JOHNSON has been chosen to head up the newly created information services division of Foremost McKesson, Inc. This new division provides information processing services to all elements of the corporation and to thousands of retail drugstores through a nationwide computer/commmunications network based in San Francisco.

Johnson has been associated with the corporation's information processing operations in various executive and managerial positions since 1977. Before that he served as director of information systems at Fairchild Camera and as president of the Remote Computer Corp.

Also elected to new positions in that company were Robert Ashworth and David Guild, division vice-presidents; and Robert Margo, vice-president of data center operations.

•••

WILLIAM E. EAGER has joined the General Tire & Rubber Co. in Akron, Ohio, as director of systems for the chemicals/plastics/industrial products group.

Eager was formerly with the Limbach Co. in Pittsburgh as director of management information services.

Eager graduated from Lycoming College with degrees in mathematics and physics and earned an M.B.A. from Gannon University. He is a native of Trenton, N.J.

•••

PETER J. DUGGAN has been elected second vice-president of New England Mutual Life Insurance Co. of Boston following that company's annual meeting.

Duggan joined New England Life in 1969 in computer systems development. After serving in several programmer and systems analysts capacities, he was promoted to systems manager in 1973 and then director in 1975. In 1977, he was elected assistant vice-president.

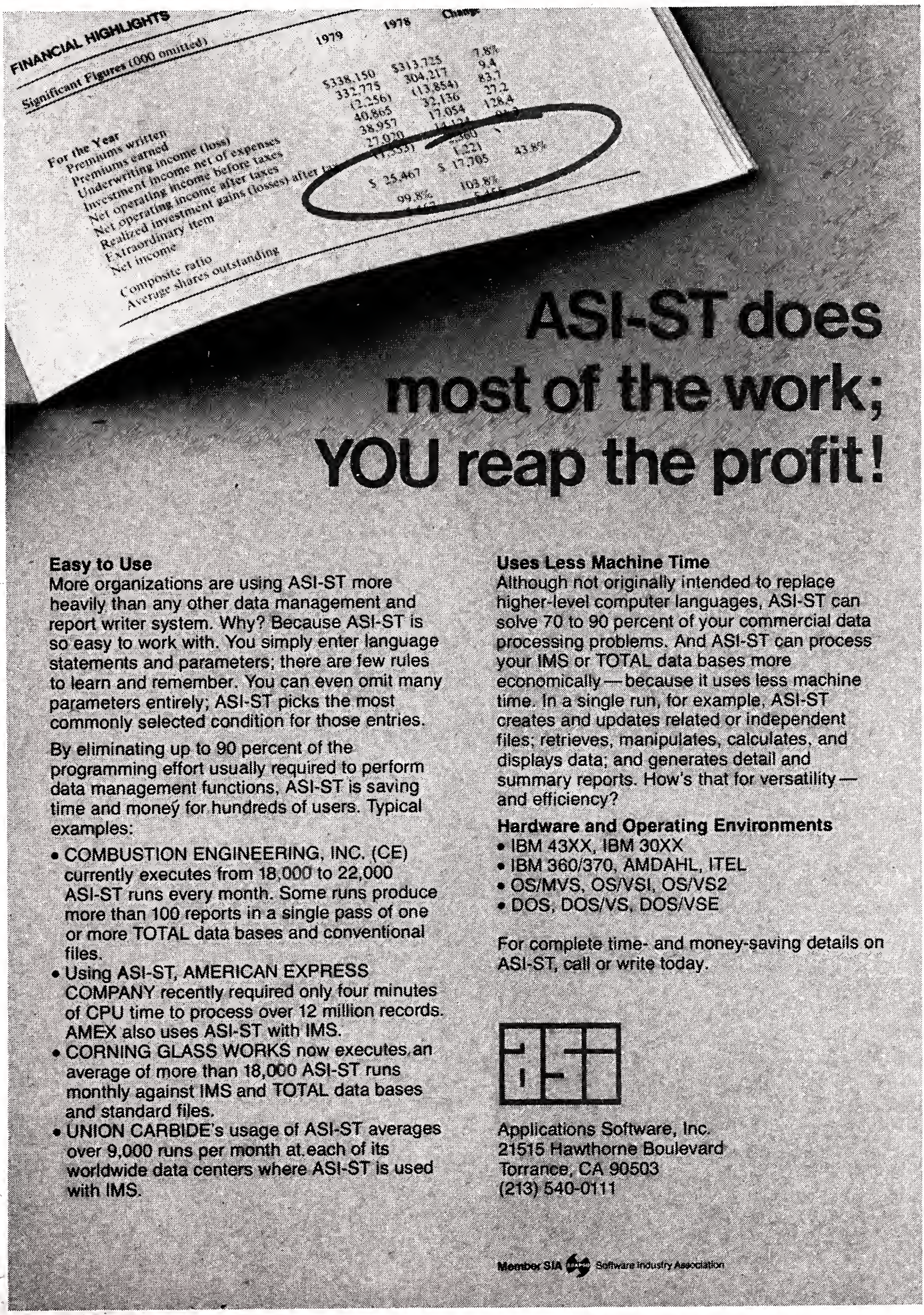
Duggan is now responsible for the systems development of all individual insurance product lines. He is a graduate of Harvard University.

•••

JOHN A. PIERCE has joined the Zurich-American Insurance Companies as director of systems and development for the head office data services department.

Pierce joins the company after having worked for Allstate Insurance Co. as the manager of group systems. He also worked as director of CBM/Consumer Systems and with Blue Cross of Ill., as manager of systems development.

He has a degree in accounting and finance from Roosevelt University in Chicago.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Flexible Disc 1s	IBM Compatible (128 B/S 26 sectors) w/ W P N	3062	2.24	–	–	–	–	–	–	–	–	–	740-0	–	–	–	–	–	–
	IBM Compatible (128 B/S 26 sectors) w/ W P N & Hub ring	3064	2.55	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Single-Headed Drives	IBM Compatible (128 B/S 26 sectors) REVERSIBLE	1729	3.35	5FD-113110	473072	54431	–	–	–	40015	–	FD-2	740/2-0	–	15150	FF34-2000	F171111X	7860-K	–
Single-Density Media	IBM System 6 Compatible	3066	2.19	–	473077	54561	–	800509	1669959	40014	–	–	740-0 0S8	–	15003	FD60-1000	F116111X	–	–
	IBM Compatible (256 B/S 15 sectors)	3109	2.19	5FD-111210	473073	–	–	800584	2305845	40040	–	–	740-3600	–	15005	FD36-1000	F112111X	7861-K	–
	IBM Compatible (512 B/S 8 sectors)	3110	2.19	–	473074	–	–	800585	1669954	40044	–	–	–	–	15004	FD60-1000	F113111X	7889-K	–
	Shugart Compatible, 32 hard sector	3015	2.19	5FD-211010	470901	53802	CM-F21	101/1	–	40016	FH1-32	FD-132	740-32	S/A-101	15025	FD32-1000	–	7890-K	421322
	Shugart Compatible, 32 hard sector REVERSIBLE	3025	3.35	5FD-213010	–	–	–	–	–	40017	–	–	740/2-32	–	15151	FF32-2000	–	7880-K	–
	Wang Compatible 32 hard sector w/Hub ring	3087	2.50	–	–	54491	–	–	–	–	–	–	740-32RM	–	–	–	F37A411X	–	–
	CPT 8000 Compatible	3045	2.79	–	–	–	–	–	–	–	–	–	–	–	15226	–	–	–	–
Flexible Disc 1d	IBM Compatible (128 B/S 26 sectors)	3090	2.95	5FD-121010	474071	54568	–	3740/1D	–	40047	FD1-128/M2100	FD-1D	741-0	–	–	FD34-8000	F131111X	7857-K	423002
	Soft Sector (128 B/S 26 sectors) REVERSIBLE	3093	3.99	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Single-Headed Drives	Shugart Compatible 32 hard sector	3091	2.95	5FD-221010	470801	54596	–	101/1D	–	40024	FH1-32D	–	741-32	S/A-103	15075	FD32-8000	F33A410X	7887-K	423322
Double Density Media	Shugart Compatible, 32 hard sector REVERSIBLE	3094	3.99	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Wang Compatible 32 hard sector w/Hub ring	3088	3.20	–	–	–	–	–	–	–	–	–	–	–	–	–	F22A411X	–	–
Flexible Disc 2s	Soft Sector (Unformatted)	3101	3.84	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Soft Sector (128 B/S 26 sectors)	3113	3.84	–	–	54428	–	800814	1766870	–	–	–	–	S/A-150	15153	FD10-4028	F121111X	–	–
Double Headed Drives	Soft Sector (256 B/S 15 sectors)	3106	3.84	–	473477	54226	–	800815	2736700	40043	FD2-256D	–	742-0	–	15154	FD10-4015	F122111X	7856-K	424612
Single-Density Media	32 Hard Sector	3108	3.84	–	–	–	–	–	–	–	FH2-32	–	–	–	–	–	–	–	–
Flexible Disc 2d	Soft Sector (Unformatted)	3102	3.49	–	473485	–	–	DY150	–	40028	FD2-XDM	FD-2D	743-0	–	15103	DD34-4001	–	–	425002
	Soft Sector (128 B/S 26 sectors)	3115	3.49	–	–	–	–	–	–	–	–	–	–	S/A-150	–	–	–	–	–
Double Headed Drives	Soft Sector (256 B/S 26 sectors)	3103	3.49	–	473471	54325	–	800817	1766872	40019	FD2-256D	–	743-0/256	–	15101	DD34-4028	F144111X	7858-K	425802
Double Density Media	Soft Sector (512 B/S 15 sectors)	3114	3.49	–	473472	54479	–	800818	1669044	40039	–	–	743-0/512	–	15100	DD34-4015	F145111X	–	425612
	Soft Sector (1024 B/S 8 sectors)	3104	3.49	–	473473	54485	–	800819	1669045	40020	–	–	743-0/1024	–	15102	DD34-4008	F147111X	7869-K	425622
	32 Hard Sector	3105	3.49	5FD-321010	470851	–	–	101/2D	–	40021	FH2-32D	–	743-32	S/A-151	15125	DD32-4000	F34A411X	7881-K	425322
	Burroughs B-80 Compatible 32 Hard Sector	3092	3.49	–	–	–	–	–	–	–	–	–	–	–	–	–	F34A611X	–	–
	Soft Sector (1024 B/S 8 sectors) w/ Hub Ring	3116	3.75	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Flexible Disc FD Memorex 651 or Equiv Drive Compatible	FD VI (Vinyl Jacket)	30712003	2.95	–	470651	–	CM-F31	FDIV	–	40002	–	FD-185	511-0	–	15026	FD85-1000	F81A111X	7910	–
Mini Flexible Disc 1s	Soft Sector (Unformatted)	3401	1.99	–	475001	54258	–	104/1	–	40500	MD1	MD 1	744-0	S/A-104	15300	MD525-01	M11A211X	7897	441002
5¼" Single-Headed Drives	10 Hard Sector	3403	1.99	–	475010	54257	–	107/1	–	40501	–	MD 110	744-10	S/A-107	15325	MD525-10	M41A211X	7898	441102
Single-Density Media	16 Hard Sector	3405	1.99	–	475016	54258	–	105/1	–	40502	MH1	MD 116	744-18	S/A-105	15328	MD525-16	M51A211X	7899	441162
	Soft Sector (Unformatted) W/Hub Ring	3431	2.19	–	–	–	–	–	–	–	–	–	–	–	–	MD525-01	–	–	–
	10 Hard Sector, w/Hub Ring	3433	2.19	–	–	–	–	–	–	–	–	–	–	–	–	MD525-10	–	–	–
	16 Hard Sector, w/Hub Ring	3435	2.19	–	–	–	–	–	–	–	–	–	–	–	–	MD525-18	–	–	–
Mini Flexible Disc 1d	Soft Sector	3417	2.24	–	–	54646	–	104/1D	–	–	–	–	–	–	–	MD540-01	–	–	–
5¼" Single-Headed Drives	10 Hard Sector	3418	2.24	–	–	54649	–	107/1D	–	–	–	–	–	–	–	MD540-10	–	–	–
Double-Density Media	16 Hard Sector	3419	2.24	–	–	54652	–	105/1D	–	–	–	–	–	–	–	MD540-16	–	–	–
Mini Flexible Disc 2d	Soft Sector	3421	2.74	–	–	54624	–	104/2D	–	–	MD2-D	–	745-0	S/A-154	–	MD550-01	–	–	–
5¼ Double Headed Drives	10 Hard Sector	3423	2.74	–	–	54627	–	107/2D	–	–	–	–	745-10	S/A-157	–	MD550-10	–	–	–
Double Density Media	18 Hard Sector	3425	2.74	–	–	54630	–	105/2D	–	–	MH2-D	–	745-18	S/A-155	–	MD550-18	–	–	–

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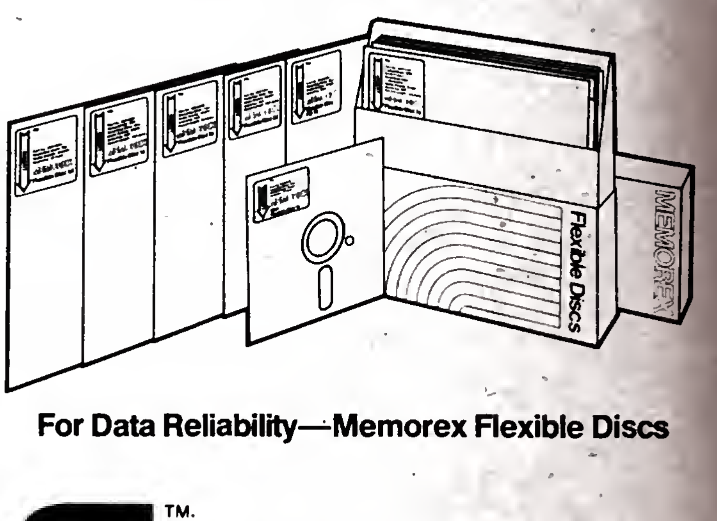

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DPMA Ready to Propose Code of Ethics

By Ann Dooley
CW Staff

CHICAGO — The Data Processing Management Association (DPMA) is on the brink of completing a Code of Ethics and Standards of Conduct which its members will be required to follow in the course of their professional careers.

In order that the proposals not be regarded as a mere "paper tiger," an enforcement provision is being included behind which the weight of the association will lie. If followed through the various due processes built into the proposal, the enforcement procedures can lead to punitive action by DPMA.

The proposal is in the "fine tuning" stage right now, according to DPMA International Vice-President J. Crawford Turner Jr.

The association has distributed copies of the standards and code to nearly 600 local DPMA chapter leaders throughout North America for review and comment.

The proposals, which have been under consideration for over two years, are expected to be brought before the association's international board of directors during its meeting Nov. 1.

New members will be required to ascribe to the rules and code upon joining the association, and current members — which number 28,000 — will do so when they renew their membership over the next year.

Basis for Judgment

The association has included a Code of Ethics in its charter for members to follow since its inception. But until now, members have had nothing to judge their behavior against.

The Standards of Conduct can be used to draw judgments regarding obligation toward management, the profession, society, the employer and colleagues, according to Turner, who is operations and communications manager at the Knoxville, Tenn., Utilities Board.

The rules are intended to be minimum levels below which an individual may be said to be engaging in unethical behavior, according to DPMA.

The enforcement procedure is not intended to act as a stick held over anyone's head, but rather as a statement of protection for the public and society as well as the individual information professional, DPMA said.

The Code of Ethics is intended to encourage the computer professional to promote an understanding of information processing methods and procedures with management, to cooperate with fellow members, to disseminate knowledge to the general public and not to misuse confidential information.

The Standards of Conduct are rules "that no true professional will violate." These rules include such areas as misuse of authority, cooperation with fellow workers, bringing charges against any person engaging in illegal or unethical practices, protecting confidential information, not exploiting the weaknesses of a computer system and protecting an employer's interests.

Enforcement Procedure

The enforcement procedures can be used to ensure that members abide by the codes and standards. To lodge a complaint against another individual, a statement of facts must be presented to the Executive Council citing the specific violations.

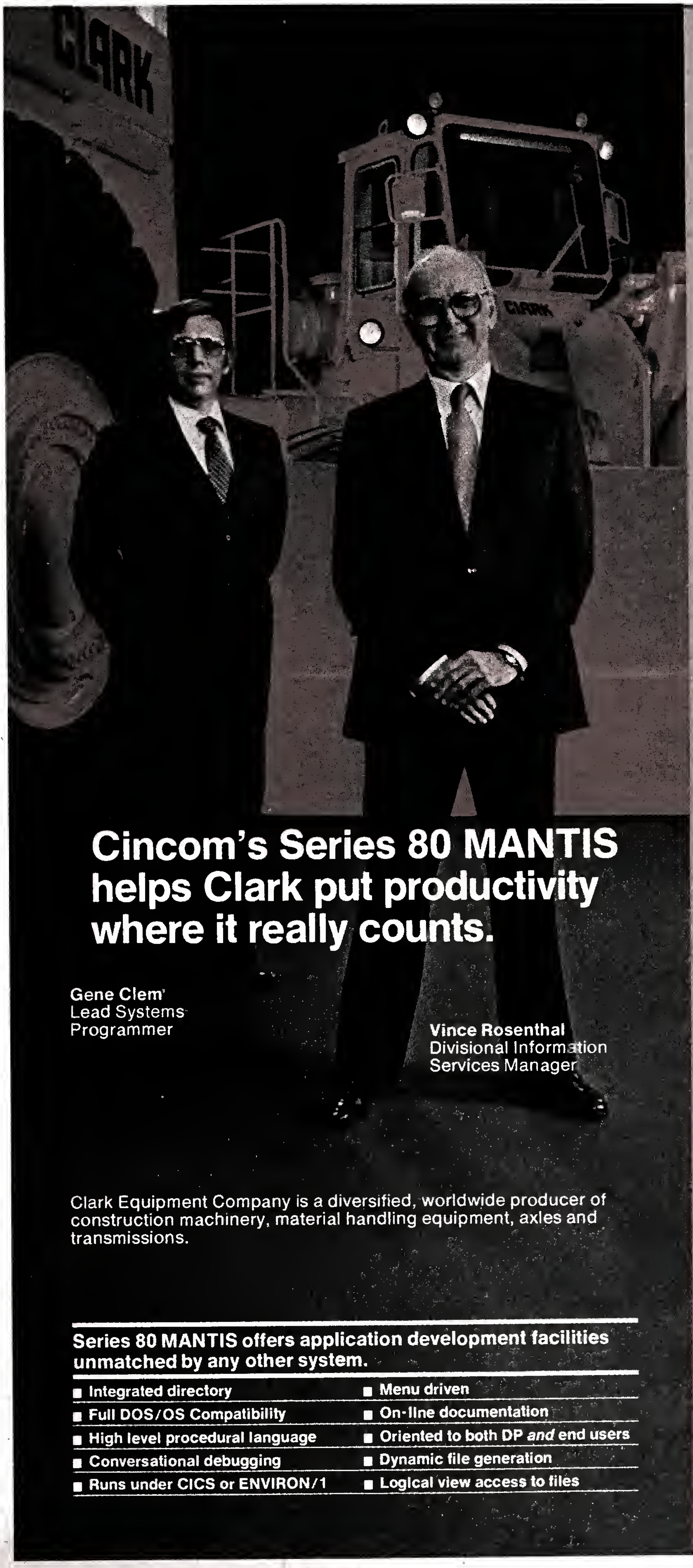
The council will review the complaint and decide if further action is warranted. If so, a hearing process is held at which time all evidence and witnesses are produced.

If unsatisfied with the decision, the accused may institute appeal proceedings.

The proposals are not meant to be seen as punitive actions that can be used against professionals, according to the association.

"DPMA must be on record as dedicated to encouraging the highest quality of information professional," DPMA International President P. Roger Fenwick proclaimed.

The proposals are expected to be enacted by the end of the year.



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Pros Swap Views on Impact Of Technology in Office

By Phil Hirsch
CW Washington Bureau

RICHMOND, Va. — "The most remarkable thing about computer technology is the little effect it has had on the office environment," according to Dr. Peter G.W. Keene, professor of management science at MIT.

However, Louis Mertes, a vice-president at Chicago's Continental Bank, said there have been extensive technological changes at the clerical level and these will soon be followed by even more dramatic changes at the professional level. Mertes described his organization's institution of a sophisticated electronic communications system, which includes in-home data terminals, electronic mail and remote-location dictation.

Mertes and Keene were two of the speakers at a recent seminar here on "Communications in the 21st Century." Funded by Phillip Morris, Inc., the meeting was sponsored by the Universities of Virginia, Pennsylvania and Southern California. Much of the discussion involved the social impacts of telecommunications technology.

More and more work will be done in employees' homes or in small satellite offices nearby, said Gail E. Bergsven, a Control Data Corp. vice-president, who added that "it will be up to the manager to adapt and to be flexible."

Dr. J. Richard Munro, president and chief executive officer of Time, Inc., cautioned that two-way cable TV could lead to polling, which is the result of "whimsy rather than careful thought."

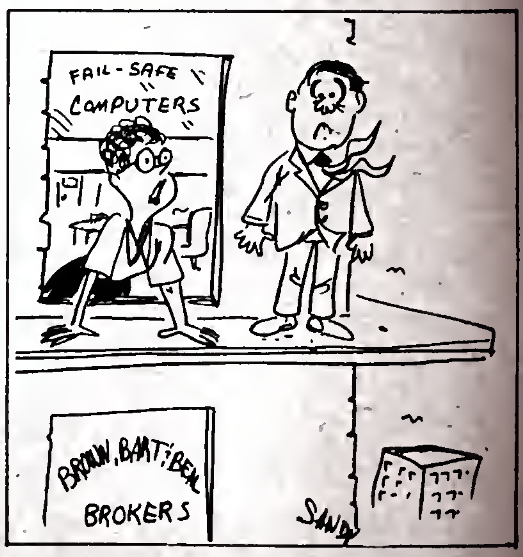
Dr. Kaarle Nordenstreng of the University of Finland, said more resources should be invested in the communications of Third World countries. He and others suggested that the additional communications channels created by cable and satellites threaten to debase public taste and control public opinion.

Two environmental activists, B. Lovins and L. Hunter Lovins, suggested that preoccupation with electronic technology is diverting the nation's policymakers. They contended that the Central Intelligence Agency's Iranian analysts were "so preoccupied with fancy electronics interceptions that they neglected to read the writing on the wall done with spray cans" and consequently failed to predict the overthrow of the Shah.

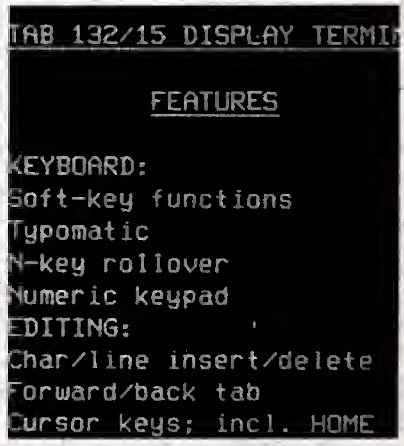
Rep. Tim Wirth (D-Colo.), chairman of the House Communications Subcommittee, was concerned about the falling literacy rate in the U.S. He suggested that growing dependence on TV would make it worse.

If that is a problem, there is a simple solution, suggested Dr. Arno Penzia, director of the Research Division at Bell Laboratories: "throw the television set out of your house."

He insisted that although "people are talking about technology as if it's an evil thing, technology is whatever the human mind allows us to put together, starting with the first stick that one of our primitive ancestors picked up. Where the technology leads us, however, is another question."



'The TV Reporter Is Still Waiting. What Shall I Tell Him?'



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Martin Predicts Change In Corporate Process Fueled By Technology Acceleration

By Bob Johnson
CW New York Bureau

NEW YORK — The rapid acceleration in technology will fuel changes in the way corporations are managed over the next five years, according to James Martin.

Cheaper and smaller computers for distributed data processing (DDP) plus advances in office automation, networking and data base technology are the four chief technological forces that are revolutionizing data processing and must be reckoned with by top management, Martin told senior managers at the opening session of his "Productivity Through the New DP Revolution" world seminar here.

"Technology is going crazy, and its impact on corporations will be astounding," Martin said. "No corporation will be free of change." The low cost of computing facilities now allows companies to develop certain software without programmers, Martin said.

Increased productivity in applications development will come not through structured programming techniques, but through "user-driven" applications. With the array of packaged software on the market, he said, each user can design his own specific requirements for his minicomputer.

"Computing is too important to leave to the data processing department," Martin said. "This whole concept of user-driven computing will create a need for data administration, a new management task within the corporation that will prevent undue maintenance costs and incompatible data on different computers."

Component Strategy

An "integrated infrastructure" is essential in corporate planning, Martin stressed, adding that the networking, data base control, office of the future and information resource management components of the corporation must meld.

In networking, for example, many architectures are incompatible and a strategy for tying machines together must be formulated, he said. The need for such a strategy increases as hardware costs continue to drop and software continues to evolve.

The white-collar workforce will not escape these developments, Martin said. The objective of DP technology should be to save executive decision-making time, perhaps up to two hours per day, Martin said. This could mean the salaries of white-collar workers could be reduced 20% with office automation, Martin said.

The corporation of the future will combine word processing, data processing and other functions on the same terminal, he said. These components will be linked by networks and will be able to access many forms of information resources, necessitating management direction and support.

Small computers — "any computer installed without the permission of the data processing department," by Martin's definition — will dominate technology throughout the '80s.

"And with Josephson technology and the constant increase in the amount of components put on a single chip, mainframes will become micro-mainframes," Martin said.

All of this new technology will require new techniques, new management and new systems organization, according to Martin. The methodologies of the '70s often prevent DP management from obtaining productivity gains because the old-line thinkers are not meeting the demands of the new technology.

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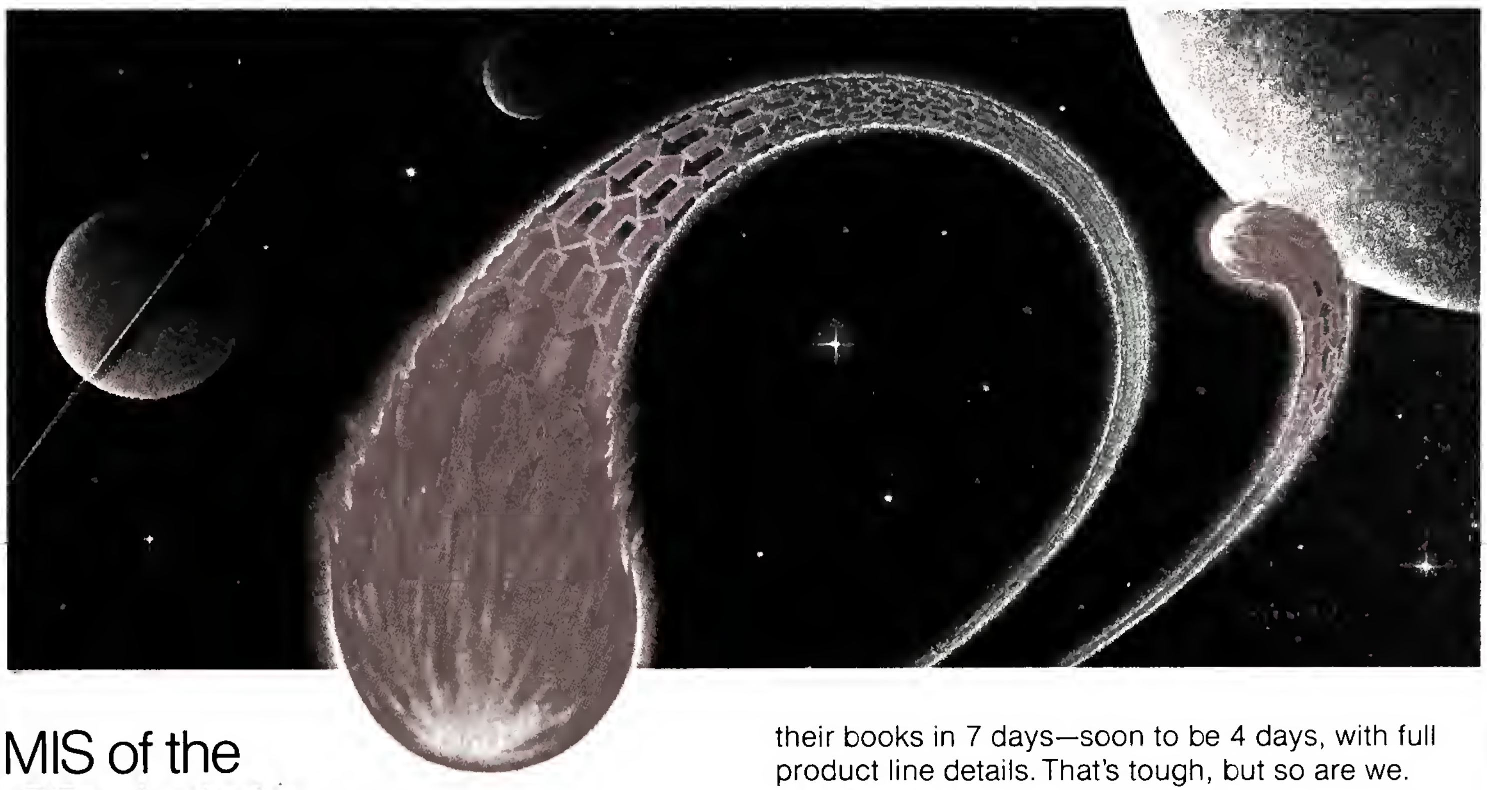

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Psychiatric Simulation

Program Suffers From Incurable Schizophrenia

By Bill Laberis
CW Staff

PHILADELPHIA — Chris, a 30-year-old unemployed loner who lives with his parents, hates women and periodically hallucinates, is suffering from incurable schizophrenia, the most common of acute mental illnesses.

Asked to talk about his mother, he replies she does not like him. Asked about work, he says he detests it. Asked what he ate for breakfast, he frequently cannot remember. In short, the lad's something of a psychological misfit.

Fortunately, he is also not real, but a sophisticated electronic figment of the creative minds of researchers here. Chris, named for the Computerized Human Role Interview Simulator, is an innovative teaching computer program developed at the Philadelphia Psychiatric Center.

Although it is not the first computerized mental health simulator, Chris may be the most advanced, being at the vanguard of an effort to produce a complicated, English language simulation program that can be easily copied and mass marketed for personal and large-scale computer users alike.

Chris was born 18 months ago, designed to be used as a tool for psychology and psychiatry students trying to hone their interviewing and diagnostic skills, according to Yoav Santo who helped create the interactive program.

With a growing vocabulary of 800 words and the ability to output more than 200 unique responses to student inquiries, Chris is "about four-fifths developed," Santo said.

Appropriate Nature

"The computer has actually proven to be very appropriate in constructing and running a schizophrenia simulation, just by its nature," Santo explained. "You see, if the computer doesn't understand a question or if it plain goofs, the student really has a hard time distinguishing whether it is the computer's fault or if that is how the patient functions. That's because schizophrenia is characterized by a break with reality and something other than rational behavior."

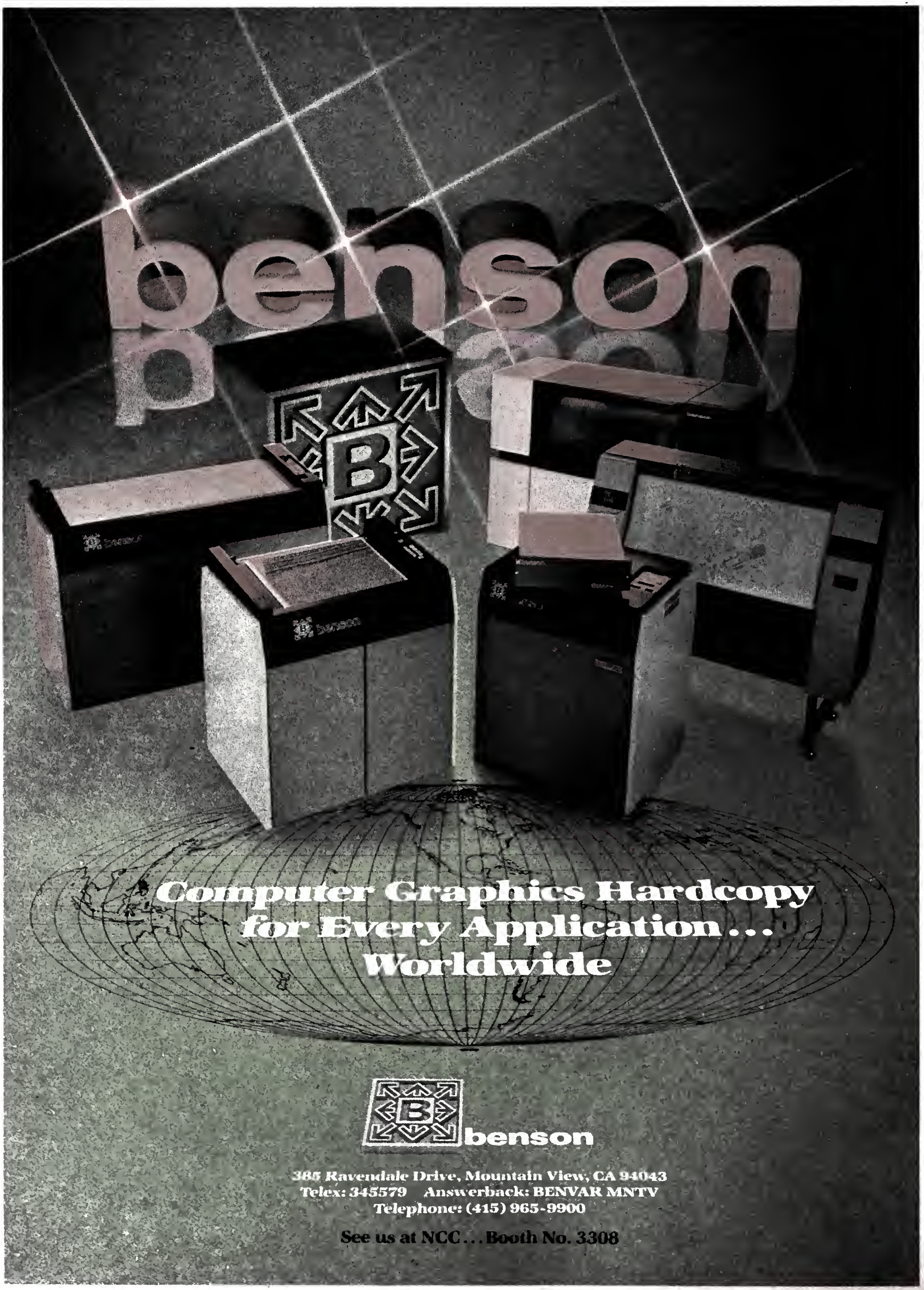
It is left entirely up to the student interviewer to figure out how to deal with Chris and his whimsical flights into fantasy. Yoav and former research programmer Andrew Finkle have premapped Chris to anticipate a student's probes and have provided Chris with a battery of contingencies for any possible follow-up questions.

In an excercise described by Santo as being recreational as well as clinical, researchers inserted Eliza, a simulated psychiatrist program, into an interactive mode with Chris.

Eliza, created at MIT in 1969, is a simulation of a patient diagnostic method developed by psychologist Carl Rogers. In effect, the Rogerian method dictates that the interviewer take a patient's statement, like "I wet the bed," and turn it into another question, like "How do you feel about that?" just to keep the conversation going.

"We ended up with a simulated psychiatrist talking to a simulated schizophrenic, and they struck up a conversation which at several times closely resembled two humans interacting," Santo said. "It was a lot like cocktail talk with all this conversation back and forth without one person really understanding the other, but the conversation goes on anyway."

Chris was written in Basic and runs on a Control Data Corp. Cyber 174 mainframe at Temple University, supporting remote data entry terminals at the research center. Santo said he hopes to eventually copy the simulation programs onto disks, which could then be run on any microcomputer with a minimum of 64K bytes of main memory.



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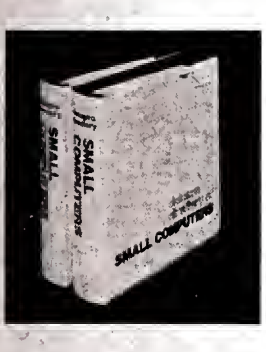

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Snafu Exposes Bank Accounts Of 'Who's Who' in Washington

By Bill Laberis
CW Staff

WASHINGTON, D.C. — It seemed like such a harmless, even efficient way to recycle some trash while at the same time getting the job done.

That's all stockroom worker Anthony Telesford and his helpers had in mind when they grabbed a bunch of scrap paper off a loading dock and began stuffing it into canvas suitcases and women's purses to primp them up for sale at Latt's Country Squire here.

The scrap paper, however, turned out to be computer printouts from the District of Columbia National Bank upstairs, printouts that had accidentally eluded the bank's paper shredder. And printed on that paper was a veritable "Who's Who" of prominent Washingtonians, along with some of their very private financial records.

All of which became embarrassingly apparent to the bank when a woman cleaned out a newly purchased handbag from Latt's and, upon examining the stuffings, found the names and bank balances of the likes of former U.S. Attorney General Benjamin Civiletti, economist Robert R. Nathan and others. To add insult to injury, Nathan had recently retired after serving 12 years on the bank's board of directors, according to published reports.

Series of Quirks

"It was just a whole series of quirks that caused the papers to miss their trip to the shredder and be used in lieu of tissue paper to stuff handbags," said bank spokesman James Brandon. "They would ordinarily have been destroyed, but there was a lot of stuff being moved around that day, as near as we can figure."

Latt's Telesford said he doesn't know how many bags and suitcases were packed with the eyes-only information, but said store employees cleaned out the remaining unsold bags once the mistake was discovered.

Meanwhile the bank, which claims to have "lots of rather influential customers," said its business and reputation has not been noticeably mired by the mixup, despite economist Nathan's obvious ire as reported in the local press.

And as far as taking steps to ensure there won't be a repeat performance, Brandon said the bank's management has "reiterated the policy on paper shredding.

"But when you come right down to it, we really can't do much to stop people from rummaging through trash barrels," he lamented.

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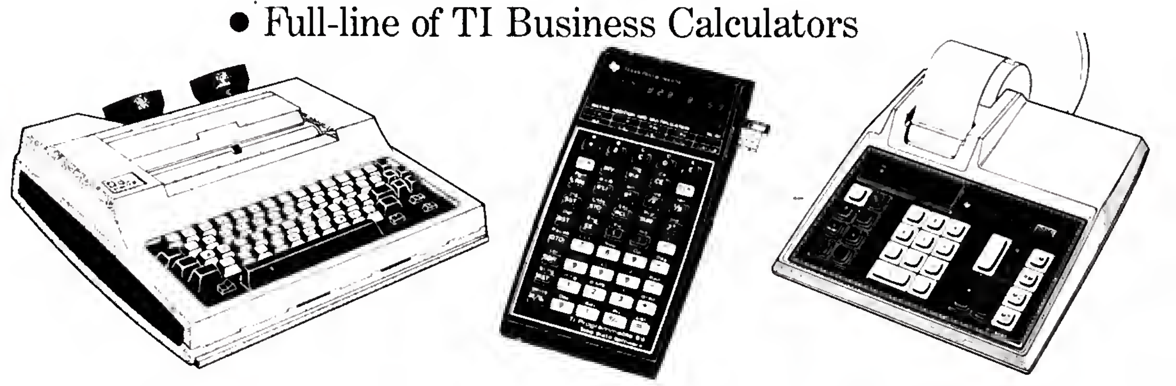

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ISO Proposes Merger Of Technical Committees

GENEVA, Switzerland — Office machines are moving closer to computers with the International Standards Organization's (ISO) decision to merge two technical committees (TC).

TC 95 on office machines and TC 97 on computers and information processing agreed to disband TC 95 and to merge that committee into TC 97, according to the American National Standards Institute (Ansi) *Reporter*. ISO's planning committee must approve the proposed merger and, if this occurs, the group's council is expected to put the merger to a vote in June, Ansi said.

The proposed title for the new committee is information systems and its scope is standardization.

Ansi will continue to hold the secretariat for the expanded TC 95, the *Reporter* noted.

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These pointer problems make both hierarchical and network data base models inflexible and difficult to modify. When the requirement to move files and applications among processors and among systems is coupled with the need to maintain the ability to transparently access the data base from any point in the network, the problems become staggering.

The solutions are in the relational database model.

A relational data base is a collection of data items represented logically as two dimensional tables. Files use logical fields within records as their only required linking mechanism. Users need not be concerned about details of structure, only about the logical relationships which exist between files. This simplicity and the ease of use inherent to relational data bases has been obscured historically by attempts of vendors to shoehorn or add on relational structure to a conventional operating system. The results are laboratory curiosities, interesting but cumbersome, and they give relational models an undeserved reputation for poor performance.

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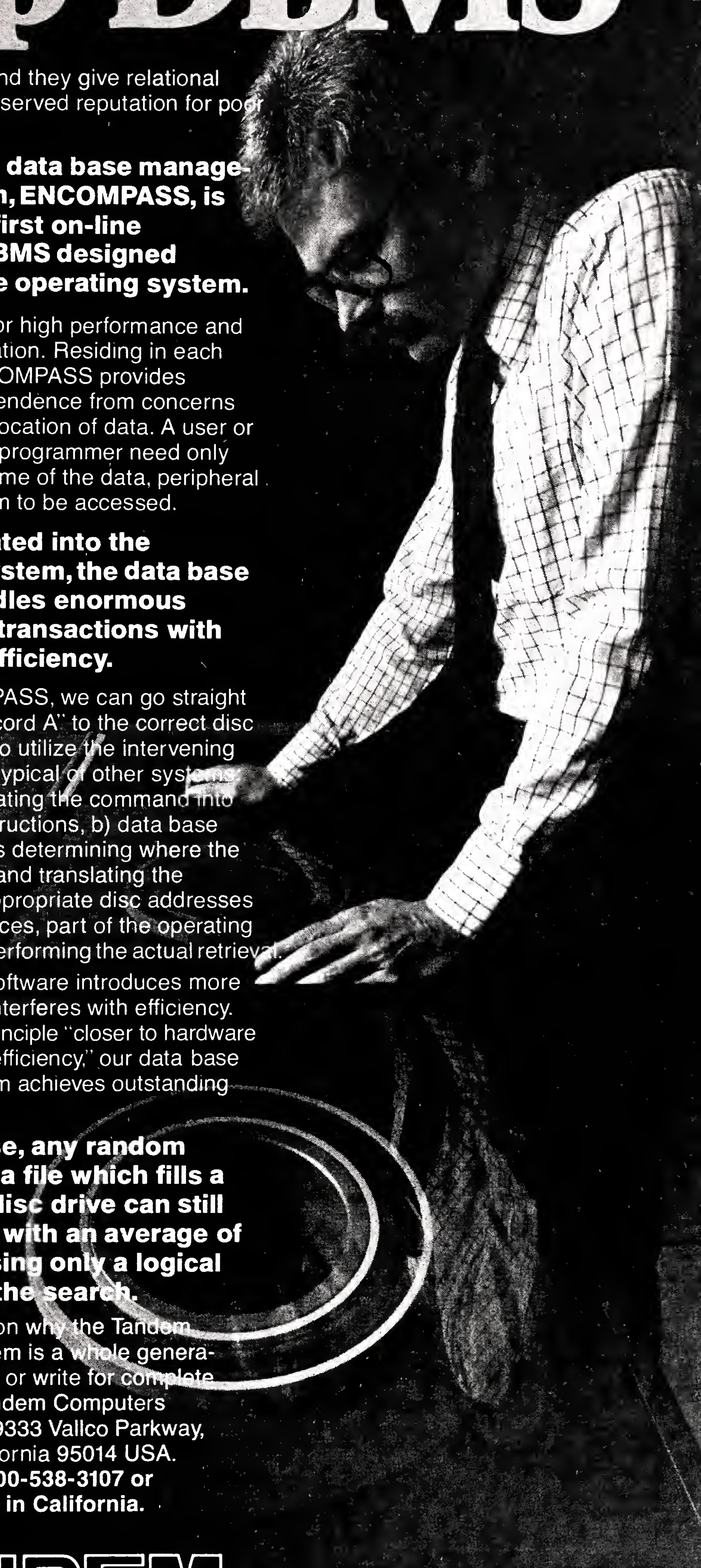

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The idea sounded simple enough, but it meant questioning and often redesigning even the most elementary aspects of a system, right down to the cooling fans. Where fail-safe systems had traditionally been thought of in terms of having a stand-by second processor, Tandem perceived that in order to be truly fault-tolerant, a system had to integrate NonStop™ operation into every one of its vital parts: hardware, software, communications, support and expansion. And to be commercially viable, there had to be no idle backups — every component had to be available for actual work.

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Additional installments in this series explore single aspects of the Tandem NonStop™ System in greater detail. Meanwhile, we welcome your interest and your inquiry. Call or write for complete information. Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014 USA. Offices throughout the USA, Canada, Europe, United Kingdom, Hong Kong, Mexico and Japan. Distributors in Australia, Finland, Greece, Korea and South America. **TOLL FREE: 800-538-3107 or (408) 725-6000 in California.**

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Ethics of Computing

Incompetence Said Worse Than Evil in Systems

By Brad Schultz
CW Staff

WALTHAM, Mass. — Where the ethics of computing is concerned, Prof. James Emery worries more about well-intentioned, incompetent systems than "evil" competent systems.

Speaking at Bentley College's recent Fourth National Business Ethics Conference here, the professor at the University of Pennsylvania's Wharton School suggested that negligence outranks avarice or malice as a cause of morally reprehensible computer systems.

Factors Overlooked

"We usually underestimate the complexity of management information systems," Emery maintained. Systems developers have ignored their creations' important organizational and social impacts by failing to appreciate limits on validity of data that runs through management information systems (MIS) and what happens when those systems force people to change life styles and work habits.

Also, many MIS professionals make poor use of existing methods and technology, Emery asserted. They often rush to implement the latest and most sophisticated products and services when simpler, more controllable approaches could be taken, he declared.

Systems developers commonly overlook significant human factors, the decision sciences professor charged, and thus produce systems that are unhealthy or unpleasant to work with. Too many systems lack sufficient flexibility, he added.

As for the cost of MIS, Emery said the true cost of systems usage and implementation is difficult to measure, but reflects far more than just outlays for equipment procurement, overhead and maintenance. A common fallacy in attempts at estimating the cost-benefits of a proposed system is that implementation can be considered a "zero-sum game," he observed.

In a zero-sum game, it is assumed that no benefit in one area can be achieved without a proportionate loss in some other area. The prudent strategist in such a situation strives for the most satisfying trade-off possible.

MIS builders have failed to recognize where no trade-off is feasible, Emery indicated. Instead of keeping a loss in one area low while enhanc-

(Continued on Page 38)

Computing Seen as Tool Rather Than Social Mover

By Brad Schultz
CW Staff

WALTHAM, Mass. — Most technical professionals see the computer as simply a tool rather than in terms of its complex effects on the way people live, Dr. Abbe Mowshowitz told the Bentley College business ethics conference held here recently.

Management information systems (MIS) developers should understand that the most careful analysis of a CPU or other machinery in a system will reveal nothing about the system's organizational impacts, observed Mowshowitz, who is a consultant and prolific author on what computing does to society.

Yet those impacts form the only meaningful basis of assessing whether a system is truly worthwhile, he pointed out.

Ethical Questions

Among ethical questions to be raised about computing are the technology's tendency to separate the consciousness of MIS professionals from the system's impacts on people and the fact that computerization acts to narrow the job descriptions of many workers. The former effect "erodes responsible action," he said, by diverting attention from the well-being of people who cannot avoid living with systems.

The latter effect — job fragmentation — occurs as systems eliminate the need for humans in a number of work functions; make some jobs more complicated, yet less related to other jobs; and restrain the life styles of people as they prepare for or engage upon many occupations, the computer scientist said.

This fragmentation effect makes it more difficult for many people to feel fulfilled in their vocations, Mowshowitz suggested, and can reduce dialogue among people in different kinds of jobs, although democratic principles call on them to cooperate in directing the course of society.

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Builder Plans 42-Story Office-of-the-Future

By Bill Laberis
CW Staff

CHICAGO — If the plan of a developer here succeeds, the ultra-efficient integrated office of the future will soon find a home in a 42-story integrated office building of the future that overlooks Grant Park and Lake Michigan.

Wylie F.L. Tuttle today is promising prospective clients a terminal in every office — and a host of other computer and telecommunications goodies to boot. The veteran developer, president of Collins Tuttle and Co., Inc., said the internal design of the proposed high rise will cater to the advanced communications needs "of a modern computer age office." He claimed it will be the first skyscraper built to do so.

Coaxial-Cable Wiring

"It will be wired throughout from scratch with coaxial cable with wall plug-in jacks everywhere," he said. "It will also feature Ethernet (Xerox Corp. local area communications network), the only building other than Exxon's world headquarters in Rochester (N.Y.) to have it. Our clients think its's marvelous; they're very excited."

Tuttle, who has taken full credit for the innovative design, said the idea came to him while he was waiting to talk with a prospective tenant of another building.

"This man — he was from a big accounting firm — wanted to make an airline reservation and was very nervous that the receptionist hadn't gotten the information straight about his flight," Tuttle said, "and there was no quick way to verify if the ticket she requested was what he wanted. So I started thinking, wouldn't it be wonderful for a big company like that to be able to plug right into the airlines reservations system from its office, or into a variety of other computerized services."

Good Possibilities

"All of a sudden there were a lot good possibilities."

Taking stock of prospective clients, Tuttle decided one such possibility would be a satellite signal capture dish placed on the roof of the building. This feature, he said, could be a particular asset to any of his commercial tenants, such as an advertisement agency.

"I have one [toothpaste manufacturer] that sells all over the world and runs ads everywhere," he explained. "So from their office, the staff can watch live broadcasts of their ads in Tokyo or Paris or anywhere there's live TV, and they'll see exactly how their ads are being run. Of course the satellite unit has other uses and applications like the various satellite news and financial services".

But Tuttle is not stopping at the capture dish and the integrated office possibilities offered by Ethernet and the coaxially-wired walls and floors.

He said he has spoken with a software consultant about the services that might be rendered, both in-house and otherwise, by a central computer that would be as much a part of the building as the central heat and air conditioning.

Tuttle said he would consider supplying the services of a central computer, one with satellite-capture capability, to other office buildings in the area, including the three others he has developed and built.

Dangers of MIS Suggested

(Continued from Page 36)

ing benefits in another area, systems developers have lost in both areas.

For example, they have run up large overhead costs and lowered data throughput, instead of minimizing costs and raising throughput, by implementing "fast systems" that seldom work reliably because certain environmental factors were neglected, he said.

A vexing problem users face with MIS is that these systems are long-term commitments, Emery stated. While users must plan, implement and apply MIS over a number of years, the economy and conditions of many industries discourages long-term commitments to expensive capital equipment, he explained.

Besides anticipating applications and how MIS may raise worker productivity, users must expect troubles in staffing and managing technical experts to operate the system, the Wharton professor concluded.

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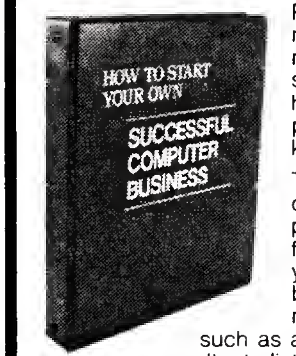

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'Users Group With a Difference'

Dama Prides Itself on Vendor Independence

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — David Schryver likes to think of the Data Administration Management Association (Dama) as a users group with a difference.

Unlike most other users groups, which usually limit their scope of concern to a single manufacturer or product, Dama is vendor-independent and deliberately looks beyond questions of narrow technical specialization.

Instead, the association tries to provide its members with a broad, general overview of data administration and addresses large, philosophical issues that cut across the boundaries of industry affiliation and systems orientation.

In short, the nonprofit group approaches data administration more from a manager's than from a technologist's or a theoretician's point of view, Schryver said.

Schryver, who administers the corporate data base for a local firm known as Hartfield-Zodys, Inc., founded Dama here last fall in the belief that data administration has only recently emerged as a discipline in its own right and that it differs significantly from other, more established computing specialties, including data base management.

Dama was also formed on the premise that, even though data administration positions are being created in ever increasing numbers, many of the people who occupy those slots have at best only a vague notion of how to proceed or what their ultimate missions should be.

The reason that so many data administrators are often at a near loss to know how to do their jobs is simple: Data administration is still such a new field of endeavor that few people have yet had a chance to decide how the function should best be performed or even exactly what the concept means.

Users Groups

So where does a newly appointed data administrator, who knows practically nothing about data administration, turn for guidance and answers? One possible solution, of course, is to join one or more of the industry's long-established users groups, but there the typical novice data administrator quickly runs into difficulties.

Though conventional users groups undeniably have their place, most are much too vendor-biased and narrow in the technical focus to appeal to a broad cross-section of data administrations or to address the large, fundamental issues that transcend the boundaries of systems brand name, model number and product class.

Instead, most such user associations tailor their interests and activities to a small, narrowly defined subgroup of the overall customer population.

Dama, by contrast, has taken just the opposite approach. Rather than restrict its concerns to highly esoteric matters or try to meet the special needs of a tiny user minority, the organization caters to data administrators of almost every stripe and devotes itself to problems and questions that go to the very heart of data administration's meaning and purpose.

Among its top priorities, for example, the group aims to dispel the industry's widespread confusion about what data administration entails and where it fits in the overall corporate scheme.

Dama also seeks to spearhead development of improved data administration techniques and explore the discipline's impact on office politics, particularly the growing tendency for other department heads to perceive data administrators as a threat to their corporate authority, Schryver said.

Schryver has never envisioned his infant association as a substitute for other, more established groups.

On the contrary, he expects Dama to complement and support these existing organizations by providing them with a conceptual foundation upon which to base their diverse, highly specialized activities.

Dama Expansion

Though still considered primarily a Southern California association, Dama intends eventually to build a nationwide organization and has begun developing branch chapters in San Francisco, Phoenix, Chicago and New York, Schryver said.

Altogether, the group boasts some 150 members.

At present, the main focus of the group's activities is its monthly chapter meetings, where members discuss an assortment of data administration topics.

More information is available from David Schryver at Harfield-Zodys, 5401 McConnell Ave., Los Angeles, Calif. 90066.

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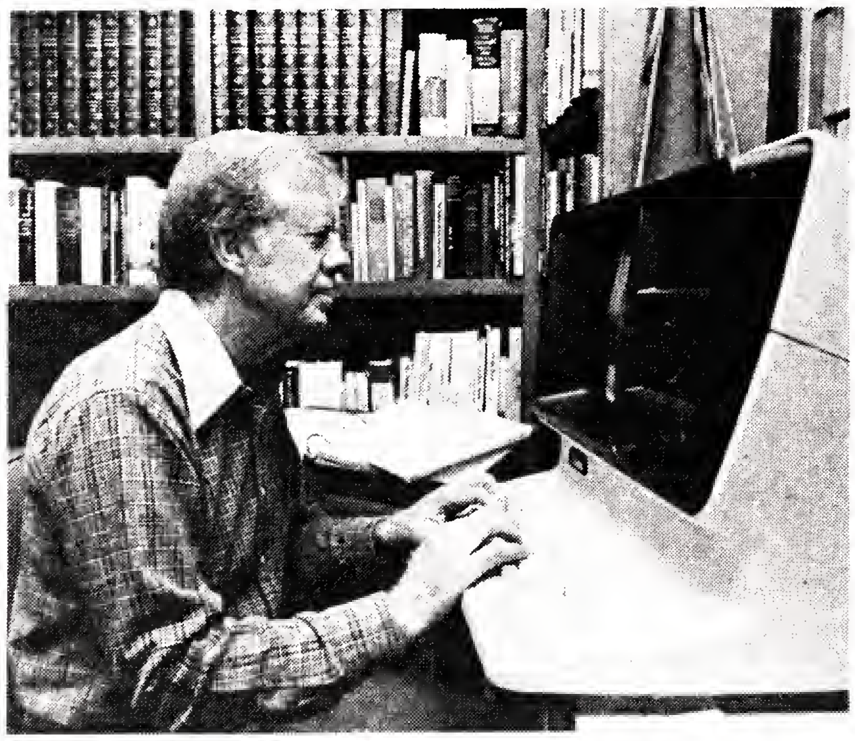

Carter at 'No Problem' Terminal

By Bill Laberis
CW Staff

PLAINS, Ga. — There was a time not long ago when the nation's chief executive, upon completing his tenure at the White House, would retire to the tranquility of the family compound and begin banging out his memoirs on an old manual Remington.

By the harsh glow of an old brass lamp, he would dredge up the glorious images of days past, interrupted at times by the clickity-clack of typewriter keys as he put it all down in black and white.

So much for the past. Today the glow on former President Jimmy Carter's face as he sets down his memoirs is a dull, luminiscent green. And the only sounds floating out the windows of his study here are the barely audible "tic-tics" from his all-plastic keyboard.

The Carters, both Jimmy and Rosalynn, are composing, editing and rewriting the sagas of their public lives on two leased word processors.

Convinced to use word processing by former White House chief of staff Hamilton Jordon, who works on his own word processor at Emory University in Atlanta, the Carters have been online for about a month now — and successfully so, from all indications.

"They were quick learners, especially the President," said Kaye King, a market support representative who trained the Carters on their Lanier Business Products, Inc. No Problem word processors. "I think Mrs. Carter might have been a little intimidated at first, but she is pretty comfortable now."

King said the former president was a particularly eager student, picking up the intricacies of the system in half the time it takes most of her students, while dazzling her with a typing speed she estimated at about 50 words per minute.

"I guess I never thought a president of these United States could type at all," she remarked. "I don't imagine he got much practice at the White House."

"It's been surprisingly easy," Carter said. "Only a couple of times have I had to call Lanier and ask, 'How do I get out of this quandary?' "

To be sure, the former president's romance with his word processor has had its ups and downs. While working feverishly on his manuscript a few weeks back, Carter inadvertently popped the wrong command, and "poof" — several pages of text disappeared into the electronic netherworld.

This prompted the installation of a special memory disk capable of saving at least a couple of days' worth of Carter's work, the rest of which he outputs on a printer. The Carters also use their word processors and printer to produce personal letters.

The president's memoirs are scheduled for publication in about a year by Bantam Books.

Kids, Teachers 'Taking to Woods' For Computing

NEW HAVEN, Conn. — For the fourth year in a row, Dr. Michael Zabinski of Fairfield University will take a group of kids into the woods and teach them about such things as CPUs, software and communications.

Joining the youngsters this summer as they learn about the birds and bees of computing will be a contingent of adults who may very well be the computer camp directors of tomorrow.

Zabinski, founder and executive director of the National Computer Camp, has offered to share the camp concept with other people interested in establishing summer retreats of their own.

For a one-time fee of about $15,000, Zabinski, who founded the camp because "youngsters need to be prepared to live in a computerized society," will franchise his camp idea to qualified individuals. The fee includes a one-week training period, insurance and materials.

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Training for future camp directors will take place during a week-long camping session scheduled for July 19 to 24 in Moodus, Conn.

To aid prospective camp directors with their business venture, Zabinski and a partner have formed Computer Camp Investment Services which will help with the financial aspects, show how to attract students and locate camp facilities.

Further information about the computer camp and camp franchises can be obtained from Computer Camp Investment Services, P.O.Box 1406, New Haven, Conn. 06510.

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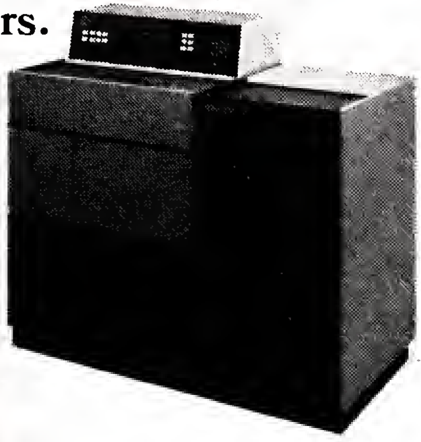

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May 27-29, San Francisco — **Quality: A Prerequisite to Survival.** Contact: American Society for Quality Control, Robert Abbott, 161 W. Wisconsin Ave., Milwaukee, Wis. 53202.

May 28, Gaithersburg, Md. — **Trends and Applications 1981: Advances in Software Technology.** Contact: I. Gray Kinnie, Conference Chairperson, P.O. Box 639, Silver Spring, Md. 20901.

May 28-29, Las Vegas — **Government ADP Procurement.** Contact: J.K. Van Wycks, Seminar Division Office, University of San Francisco, Fifth Floor, 1120 20th St. N.W., Washington, D.C. 20036. Also being held June 25-26 in Boston.

June 1-2, New York — **The Search for an Integrated Software Approach to Capacity Management.** Contact: Boole & Babbage, Inc., World Headquarters, 510 Oakmead Parkway, Sunnyvale, Calif. 94085. Also being held June 15-16 in Dallas, June 24-25 in Los Angeles.

June 1-2, Tulsa, Okla. — **EDP Systems Analysis Seminar.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151. Also being held June 3-4 in Houston.

June 1-3, Washington, D.C. — **Everyone Needs to Understand Computers: DP for Managers and Professionals.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

June 1-2, New York — **Productivity Improvement Measures for Programming Projects.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 1-3, Washington, D.C. — **Data Base Administration & Control.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 1-3, Washington, D.C. — **Second Annual Seminar on Security of Federal Automated Information Systems.** Contact: Madonna Meagher, Graduate School, USDA, 277 National Press Building, Washington, D.C. 20045.

June 1-9, St. Charles, Ill. — **Computer Fundamentals.** Contact: Muriel Lederer, Arthur Andersen & Co., 69 W. Washington St., Chicago, Ill. 60602.

June 1-3, Dallas — **On-Line Systems Design.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

June 1-5, New York — **Systems Analysis Workshop.** Contact: Advanced Training Center, Division of Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

June 1-5, Short Hills, N.J. — **Systems Analysis Workshop.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20014. Also being held June 1-5 in Chicago, Ill.

June 1-5, Boston — **Analysis Skills for Requirements Definition.** Contact: The Structured Technologies Group, 89 Franklin St., Boston, Mass. 02110.

June 1-5, New York — **"SNA, But Not All IBM" Symposium.** Contact: TCT International, 599 N. Mathilda Ave., Sunnyvale, Calif. 94086.

June 1-5, London — **How to Develop an Effective Long-Range Data Processing Plan.** Contact: Dr. Robert Keston, Keston Associates, 11317 Old Club Road, Rockville, Md. 20852. Also being held June 15-19 in Jackson Hole, Wyo.

June 2-4, St. Charles, Ill. — **MAC-PAC (Cobol) Design.** Contact: Muriel Lederer, Arthur Andersen & Co., 69 W. Washington St., Chicago, Ill. 60602.

June 2-4, Raleigh, N.C. — **SAS Two-Day Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

June 2-4, Utrecht, Netherlands — **International Exhibition: Europe Software 1981.** Contact: Royal Netherlands Industries Fair, P.O. Box 8500, 3503 RM Utrecht, Netherlands.

June 2-4, Washington, D.C. — **Designing Human Factors in Computer Graphics.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

June 2-4, Teaneck, N.J. — **Leadership: Managing & Influencing People.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

June 4-5, Washington, DC — **Data Dictionary/Directory Systems.** Contact: The Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 4-5, New York — **Productivity: The Problem, The Solutions.** Contact: McGraw Hill Conference & Exposition Center, Suite 3677, 1221 Ave. of the Americas, New York, N.Y. 10020.

June 7-11, San Francisco — **Stretching the Public Dollar.** Contact: Ray Choy, Room 2A, City Hall, San Francisco, Calif. 94102.

June 8-12, Los Angeles — **Structured Systems Design/Structured Program Design.** Contact: Ken Orr & Associates, Inc., 715 E. 8th, Topeka, Kan. 66607. Also being held June 15-19 in Topeka, Kan.

June 8, Washington, D.C. — **Japan Telecom-81.** Contact: John Carr, Coordinator, IGI International Mar-

(Continued on Page 46)

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New York	WPIX	11	Saturday	9:00 AM
Chicago	WSNS	44	Tuesday	6:30 PM
Los Angeles	KWHY	22	Saturday	12:00 Noon
San Francisco	KTSF	26	Saturday	9:30 AM
Boston	WXNE	25	Wed.	10:30 PM
Washington, DC	WDCA	20	Saturday	12:00 Mid.
Philadelphia	WTAF	29	Tuesday	10:30 PM**
Dallas/Ft. Worth	KNBN	33	Tuesday	5:30 PM
Detroit	WXON	20	Saturday	10:00 AM
Minneapolis/ St. Paul	KMSP	9	Saturday	TBA*
Houston	KHTV	39	Monday	12:00 Mid.
St. Louis	KDNL	30	Sunday	5:30 PM
Atlanta	WANX	46	Tuesday	11:00 PM

*Check local listings for time.
**This week only. Regularly on Monday nights at this time.

Calendar

(Continued from Page 43)

keting Seminars, Information Gatekeepers, Inc., Suite 111, 167 Corey Road, Brookline, Mass. 02146.

June 8-9, Arlington, Va. — **Disaster Management.** Contact: ASIS, Education & Seminar Programs Department, Suite 651, 2000 K Street N.W., Washington, D.C. 20006.

June 8-10, Boston — **Writing for Results: A Course for Computer Professionals.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

June 8-12, Pittsburgh — **Project Leadership Workshop.** Contact: Brandon Systems Institute, Inc., 4720 Montgomery Lane, Bethesda, Md. 20014. Also being held June 9-11 in Short Hills, N.J.

June 8-10, Atlanta — **The Art of Managing Data Processing.** Contact: Deborah Tchorzewski, Nolan, Norton & Co., One Forbes Road, Lexington, Mass. 02173. Also being held June 29-July 1 in Boston.

June 8-10, Boston — **Structured Analysis and Design.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 8-10, Chicago — **Data Base Concepts, Structures and Access Methods.** Contact: The Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 8-10, San Francisco — **Successful Application of Minicomputer Systems.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 8-10, Washington, D.C. — **Computer Operations Management.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 8-10, Santa Clara, Calif. — **SNA Architecture and Implementation.** Contact: Communications Solutions, Inc., Suite 200, 4040 Moorpark Ave., San Jose, Calif. 95117.

June 8-10, Atlanta — **Decision Support Systems — '81.** Contact: Julie Eldredge, The Institute of Management Science, 146 Westminster St., Providence, R.I. 02903.

June 8-10, Boston — **Fundamentals of Data Communications.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

June 8-10, Washington, D.C. — **Software Design for Data Communication Systems.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052

June 8-11, New York — **Computer Contract Negotiations.** Contact: Ruth K. Dargis, Brandon Consulting Group, Inc., 1775 Broadway, New York, N.Y. 10019.

June 8-11, Seattle — **Software Quality Assurance: A Management Systems Approach.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

June 8-11, Washington, D.C. — **Introduction to Ada Computer Programming Language.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

June 8-12, Seattle — **Structured Analysis, Design and Testing of Computer Systems.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

June 8-12, Philadelphia — **Systems Design Workshop.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

June 8-12, Los Angeles — **Structured Systems Design/Structured Program Design.** Contact: Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607. Also being held June 15-19 in Topeka.

June 9-11, Dallas — **Ada Programming Structures.** Contact: Office of Special Programs, Polytechnic Institute of New York, 333 Jay St., Brooklyn, N.Y. 11201. Also being held June 17-19 in Washington, D.C., and June 24-26 in Los Angeles.

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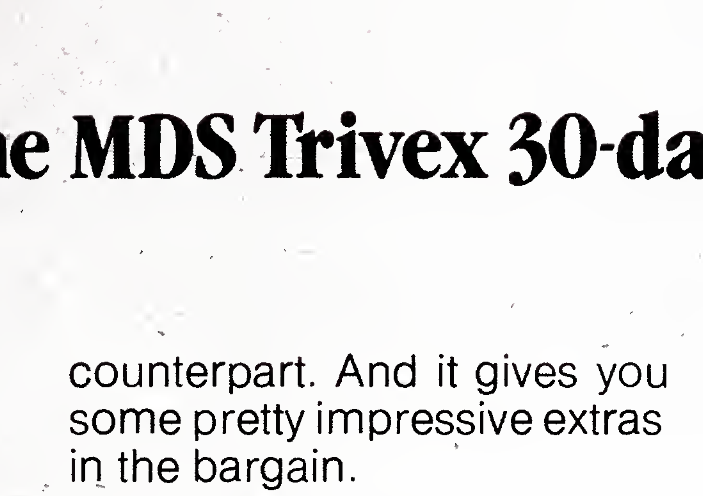

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Datapro Finds Magnuson Satisfied Users Most

(Continued from Page 1)

they did and if they would recommend their particular system to another user.

Nearly six times as many IBM users than those polled in last year's survey plan to leave the IBM fold. More than 23% of the 1,075 IBM users questioned revealed that 1981 could be a non-IBM mainframe year, as opposed to only about 4% in the last survey.

By the same token, nearly 13% of the 135 Univac users and about 16% of the 246 Burroughs Corp. users surveyed signaled that a vendor switch was in the works.

In addition, nearly 6% of the Magnuson system users said they would change vendors sometime this year.

User Recommendations

Would the users recommend their systems to other users? Nearly 30% of the 163 Honeywell users polled said they would not. In particular, almost half the current Series 2000 users reported that they would not recommend their systems.

In the same vein, more than 33% of the 112 present IBM 3032 users surveyed indicated they would not recommend that system to a prospective buyer. However, less than 4% of these users, who are planning to switch mainframes, reported they would seek a vendor other than IBM for future systems.

Besides expansion to and sometimes replacement of present hardware, the majority of those polled said they would be expanding their data communications facilities. About 72% of the Magnuson users, 66% of the Amdahl users and 52% of the IBM users reported communications expansion plans for the coming year.

Software is another big expansion area for 1981. The majority of the users will opt for proprietary software packages from suppliers other than the mainframe vendors, the report noted.

User Expectations

One question posed for the first time this year by Datapro concerned users' expectations of a computer system. Datapro essentially asked users whether their systems delivered all that the vendors promised before the machines were plugged in.

An average of more than 10% of the 163 Honeywell computer users — representing 182 installed systems — revealed that their systems were not all they were cracked up to be. Honeywell's Series 6000 generated the largest share of user dissatisfaction, with more than 16% of its 12 users polled indicating that they were unpleasantly surprised by the system's capabilities.

The Series 6000 was followed by the Series 2000; two of the 17 users surveyed claimed unmet expectations. The Level 62 and 64 computers, with 81 users, each racked up about 11% on the negative side.

The next closest vendor on the disillusionment scale was Univac. A little more than 8% of the 135 Univac users polled told Datapro that their systems did not meet all their expectations. Most user dissatisfaction was aimed at the Univac 90/30, 90/40 and 90/70 machines, older systems which were introduced by the firm between 1973 and 1978.

Two systems in the 1100 series — the 1100/10 and the 1100/08 — fared considerably better, with 100% of the users indicating they would recommend those computers to other users.

Advantages and Disadvantages

In the survey, users were also asked to list each system's significant advantages and disadvantages. Surprisingly, on the plus side, a number of users noted that system costs were less than expected. More than 55% of the Magnuson users and roughly 43% of those using Amdahl machines found that first price quotes were actually larger than what ended up on the final bottom line.

In addition, every one of the 10 vendors scored received high marks — ranging from about 33% to 89% — for system compatibility, which included the ability to carry programs over from one system and easily implement them on another.

The disadvantages cited by users? Burroughs Corp., CDC and Honeywell users reported that installation of their equipment was late. In fact, the rate of late CDC equipment deliveries and installations increased from zero in last year's survey to more than 10% this year.

Also, a healthy portion of the vendors mentioned in this year's survey did not provide all of the promised software and support, users said. More than 23% of the Honeywell and NCR computer users indicated they felt shortchanged in both these areas.

In addition, five other vendors — including IBM, DEC and Burroughs — were rated by 10% or more of their systems users as negligent in software and support.

None of Magnuson's 18 polled users reported any problems with late equipment installations or deliveries, and none cited any shortcomings in the areas of software or support.

Asked what they are doing with their mainframe systems, most users answered that they operate out of a centralized processing site with a number of local and remote workstations and terminals. A very small percentage reported distributed processing mainframe activities, the largest segment being about 5% of the DEC system users.

The Datapro survey also covered principal applications (the most widespread being accounting and billing), the source of these applications programs (mostly from in-house personnel) and the use of data base management systems (about 50% of the users polled indicated they had one running on their mainframes).

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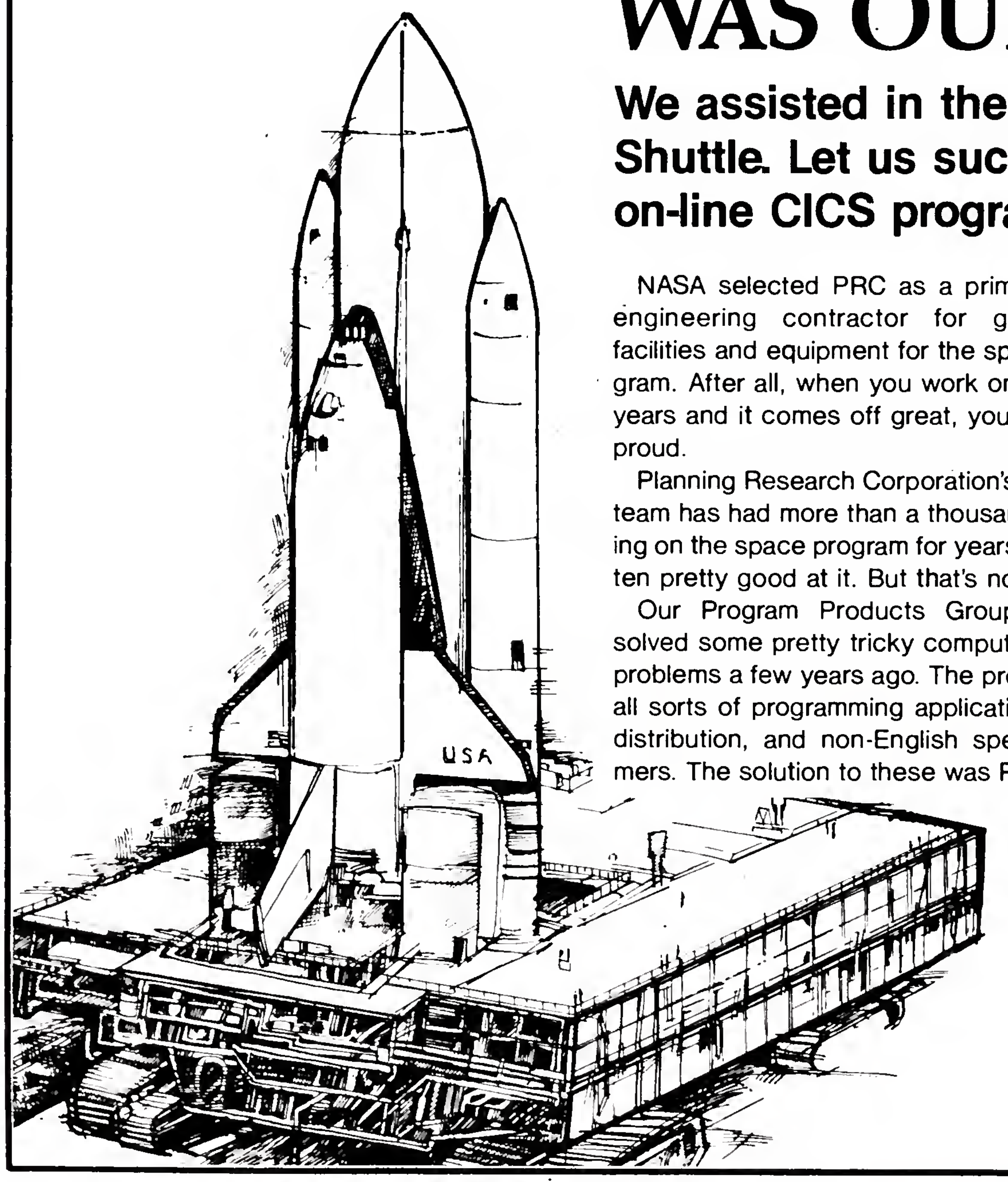

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Users Rate Their Mainframes . . .

Manufacturer and Model Survey Item	Amdahl 470 V/5	Amdahl 470 V/6	Amdahl 470 V/6-II	Amdahl 470 V/7	Amdahl 470 V/8	Burroughs B 1700	Burroughs B 1800	Burroughs B 1855	Burroughs B 1900
No. of User Responses	4	8	7	4	7	20	41	50	16
No. of Systems Represented	4	10	10	5	12	21	51	52	18
Avg. Life of System (Mos.)	20.0	37.7	32.0	11.3	10.4	47.5	20.3	15.5	4.8
Acquisition Method (%)									
Purchase	25.00	62.50	85.71	50.00	71.43	75.00	66.67	50.00	37.50
Rental or Lease from Mfr.	25.00	25.00	0.00	50.00	0.00	25.00	25.64	50.00	62.50
Lease from 3rd Party	50.00	12.50	14.29	0.00	28.57	0.00	7.69	0.00	0.00
Principal Applications (%)									
Accounting/Billing	75.00	50.00	100.00	50.00	100.00	80.00	70.73	76.00	87.50
Banking-check processing loans/savings	0.00	25.00	28.57	25.00	14.29	20.00	26.83	14.00	12.50
Construction/Architecture	0.00	50.00	14.29	0.00	0.00	5.00	0.00	6.00	6.25
Education-scheduling/administration	0.00	50.00	14.29	25.00	0.00	0.00	9.76	8.00	12.50
Engineering/Scientific	25.00	37.50	28.57	25.00	42.86	0.00	2.44	4.00	6.25
Health care/Medical	50.00	0.00	28.57	25.00	14.29	5.00	4.88	6.00	6.25
Insurance	0.00	12.50	14.29	25.00	14.29	5.00	12.20	2.00	18.75
Manufacturing	25.00	12.50	0.00	0.00	28.57	20.00	17.07	20.00	31.25
Mathematics/Statistics	25.00	37.50	42.86	25.00	28.57	0.00	12.20	2.00	0.00
Order Processing/Inventory Control	50.00	62.50	28.57	25.00	42.86	55.00	46.34	46.00	56.25
Payroll/Personnel	75.00	50.00	100.00	50.00	57.14	30.00	48.78	72.00	68.75
Petroleum/Fuel analysis	0.00	12.50	0.00	0.00	0.00	0.00	9.76	2.00	0.00
Process control	25.00	12.50	0.00	0.00	0.00	0.00	0.00	4.00	6.25
Purchasing	25.00	62.50	71.43	25.00	42.86	40.00	21.95	28.00	43.75
Sales Distribution	25.00	25.00	28.57	0.00	57.14	25.00	34.15	34.00	25.00
Other	50.00	12.50	71.43	25.00	28.57	20.00	21.95	20.00	25.00
Source of Applications Programs (%)									
In-house personnel	100.00	100.00	100.00	100.00	100.00	75.00	90.24	92.00	93.75
"Ready-made" programs from manufacturer	25.00	37.50	57.14	0.00	14.29	35.00	36.59	36.00	43.75
Contract Programming	50.00	50.00	71.43	25.00	28.57	30.00	39.02	24.00	62.50
Manufacturer's Personnel	0.00	12.50	14.29	0.00	0.00	0.00	2.44	0.00	6.25
Proprietary Software Packages	75.00	62.50	85.71	25.00	42.86	25.00	36.59	28.00	37.50
Location of Computer (%)									
Distributed Processing Site	0.00	0.00	0.00	0.00	0.00	5.00	7.50	0.00	6.25
Central Processing Installation	100.00	100.00	100.00	100.00	100.00	95.00	92.50	100.00	93.75
Using Local Workstations/Terminals (%)	100.00	100.00	100.00	100.00	85.71	75.00	97.57	100.00	93.75
Using Remote Workstations/Terminals (%)	100.00	100.00	100.00	100.00	100.00	20.00	56.10	56.00	68.75
Using Data Base Management System (%)	100.00	75.00	100.00	100.00	100.00	20.00	43.90	48.00	56.25
None	0.00	25.00	0.00	0.00	0.00	80.00	56.10	52.00	43.75
Manufacturer's Package	25.00	33.00	42.86	25.00	42.86	75.00	83.33	87.50	88.89
Outside Vendor's Package	75.00	66.67	57.14	75.00	42.86	25.00	0.00	4.17	0.00
Home-Grown System	0.00	0.00	0.00	0.00	14.29	0.00	16.67	8.33	11.11
Using Communications Monitor (%)	100.00	75.00	100.00	100.00	100.00	30.00	65.85	60.00	81.25
None	0.00	25.00	0.00	0.00	0.00	65.00	31.71	38.00	18.75
Manufacturer's Package	0.00	0.00	0.00	0.00	0.00	100.00	85.19	86.67	92.31
Outside Vendor's Package	25.00	33.33	57.14	33.33	57.14	0.00	3.70	3.33	0.00
Home Grown System	75.00	66.67	42.86	66.67	42.86	0.00	11.11	10.00	7.69
Using Integrated Word Processing Functions (%)	100.00	12.50	10.00	125.00	75.00	10.00	9.76	12.00	12.50
Planned Acquisitions/Implementations for 1981 (%)									
Additional Software from the Manufacturer	25.00	37.50	57.14	0.00	71.43	5.00	31.71	30.00	43.75
Proprietary Software from other suppliers	50.00	75.00	85.71	75.00	71.43	15.00	26.83	24.00	31.25
Expansions to Data Communications facilities	25.00	62.50	71.43	75.00	85.71	30.00	60.98	60.00	75.00
Distributed Processing capabilities	50.00	62.50	57.14	25.00	57.14	0.00	17.07	6.00	12.50
Expansions to present hardware	25.00	75.00	100.00	50.00	85.71	35.00	51.22	50.00	56.25
Another Computer System, same model	25.00	25.00	0.00	0.00	0.00	5.00	4.88	4.00	18.75
Integrated Word Processing capabilities	25.00	12.50	14.29	25.00	28.57	10.00	14.63	8.00	18.75
Plans for system replacement in 1981 (%)									
Yes, same manufacturer	0.00	0.00	0.00	25.00	0.00	35.00	19.51	2.00	18.75
Yes, vendor unknown	0.00	25.00	28.57	0.00	0.00	5.00	4.88	2.00	0.00
Yes, different vendor	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00
No	100.00	75.00	71.43	75.00	100.00	45.00	75.61	96.00	75.61

Amdahl 470 V/5	Amdahl 470 V/6	Amdahl 470 V/6-II	Amdahl 470 V/7	Amdahl 470 V/8	Burroughs B 1700	Burroughs B 1800	Burroughs B 1855	Burroughs B 1900	Manufacturer and Model Survey Item
									Significant Advantages (%)
50.00	37.50	28.57	50.00	28.57	20.00	51.22	62.00	68.75	Users are happy with response time
25.00	25.00	28.57	50.00	14.29	45.00	80.49	86.00	100.00	System is easy to expand/reconfigure
25.00	75.00	42.86	75.00	0.00	10.00	19.51	20.00	18.75	System costs were less than expected
75.00	87.50	85.71	75.00	71.43	30.00	56.10	52.00	68.75	Programs/data carried over from other systems are compatible, as vendor promised
50.00	75.00	85.71	75.00	57.14	10.00	36.59	32.00	50.00	Terminals/peripherals carried over from other systems are compatible, as vendor promised
50.00	25.00	42.86	75.00	57.14	10.00	31.71	24.00	56.25	System is power/energy efficient
0.00	12.50	0.00	0.00	14.29	30.00	36.59	66.00	62.50	Productivity aids help us keep programming costs down
0.00	12.50	0.00	25.00	14.29	20.00	26.83	38.00	50.00	Data base language is efficient and effective
50.00	50.00	57.14	75.00	57.14	0.00	12.20	10.00	25.00	Delivery and/or installation of equipment was ahead of schedule
0.00	12.50	0.00	25.00	0.00	0.00	4.88	10.00	18.75	Delivery of required software was ahead of schedule
									Significant Problems (%)
0.00	0.00	14.29	0.00	0.00	25.00	9.76	2.00	6.25	Computer proposed by vendor was too small
0.00	0.00	0.00	0.00	0.00	25.00	29.27	38.00	37.50	Installation of equipment was late
0.00	0.00	0.00	0.00	0.00	10.00	17.07	18.00	6.25	Delivery of required software was late
25.00	0.00	14.29	0.00	14.29	10.00	7.32	6.00	6.25	System costs (for hardware, vendor-supplied software, support) exceeded the expected total
0.00	0.00	14.29	25.00	0.00	45.00	9.76	20.00	18.75	Vendor did not provide all the promised software or support
0.00	0.00	0.00	0.00	0.00	0.00	7.32	2.00	0.00	Program/data compatibility not what vendor promised
0.00	0.00	0.00	0.00	0.00	10.00	9.76	4.00	6.25	Terminals/peripherals compatibility not what vendor promised
0.00	0.00	14.29	0.00	0.00	30.00	14.63	14.00	0.00	Vendor enhancements/changes to hardware/software hard to keep up with
0.00	0.00	0.00	0.00	0.00	30.00	9.76	10.00	6.25	Equipment is excessively noisy
0.00	0.00	14.29	0.00	0.00	35.00	2.44	10.00	0.00	Power and/or cooling requirements are excessive
									System Ratings (4.0-0.0)
3.25	3.25	3.43	3.50	3.57	3.50	3.65	3.72	3.75	Ease of operation
3.50	3.63	3.86	3.75	3.29	3.00	3.51	3.60	3.50	Reliability of Mainframe
3.25	3.25	3.00	3.00	2.86	2.20	2.83	2.82	2.94	Reliability of Peripherals
									Maintenance service
4.00	3.63	3.43	3.50	3.71	2.50	2.95	2.92	2.81	Responsiveness
3.75	3.50	3.14	3.25	3.00	2.25	2.70	2.78	2.88	Effectiveness
									Technical support
3.50	3.38	3.00	3.50	3.00	1.95	2.36	2.47	2.50	Trouble-shooting
3.50	3.25	2.57	3.33	3.00	2.22	2.32	2.63	2.69	Education
3.50	3.13	3.14	3.00	2.86	1.84	2.00	2.18	2.31	Documentation
									Manufacturer's software:
3.00	3.25	3.17	3.33	3.00	3.45	3.73	3.70	3.75	Operating system
3.00	3.25	3.17	3.00	3.33	3.11	3.47	3.46	3.50	Compilers & Assemblers
3.00	3.00	3.25	3.00	3.00	2.00	2.70	2.85	2.44	Applications Programs
3.33	3.13	3.00	3.50	3.20	3.00	3.47	3.49	3.50	Ease of programming
3.50	3.38	3.33	3.67	3.20	3.00	3.19	3.28	3.20	Ease of conversion
3.25	3.25	2.71	3.50	3.00	2.53	3.17	3.24	3.38	Overall satisfaction
									Did the system do what you expected it to do? (%)
100.00	100.00	100.00	100.00	100.00	65.00	80.49	92.00	93.75	Yes
0.00	0.00	0.00	0.00	0.00	30.00	9.76	4.00	0.00	No
0.00	0.00	0.00	0.00	0.00	5.00	9.76	4.00	6.25	Haven't decided
									Would you recommend system to another user? (%)
100.00	100.00	85.71	100.00	100.00	55.00	80.49	84.00	100.00	Yes
0.00	0.00	0.00	0.00	0.00	30.00	7.32	8.00	0.00	No
0.00	0.00	14.29	0.00	0.00	15.00	9.76	8.00	0.00	Haven't decided

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. . . And Their Manufacturers

Manufacturer and Model / Survey Item	Burroughs B 2700	Burroughs B 2800	Burroughs B 3700	Burroughs B 3800	Burroughs B 4700	Burroughs B 4800	Burroughs B 6700	Burroughs B 6800	Burroughs B 7800
No. of User Responses	6	20	7	12	9	21	8	21	5
No. of Systems Represented	6	22	8	12	9	27	12	30	8
Avg. Life of System (Mos.)	76.3	23.8	51.7	14.8	57.3	14.6	57.5	17.3	31.6
Acquisition Method (%)									
Purchase	50.00	50.00	42.86	58.33	55.56	38.10	62.50	75.00	40.00
Rental or Lease from Mfr.	50.00	45.00	28.57	25.00	44.44	61.90	37.50	5.00	40.00
Lease from 3rd Party	0.00	5.00	28.57	16.67	0.00	0.00	0.00	20.00	20.00
Principal Applications (%)									
Accounting Billing	66.67	40.00	71.43	50.00	66.67	71.43	62.50	76.19	100.00
Banking-check processing/loans/savings	16.67	55.00	28.57	50.00	11.11	38.10	0.00	14.29	0.00
Construction/Architecture	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education-scheduling/administration	16.67	0.00	14.29	8.33	22.22	4.76	50.00	28.57	0.00
Engineering/Scientific	0.00	0.00	0.00	0.00	0.00	0.00	12.50	9.52	60.00
Health care/Medical	0.00	10.00	0.00	0.00	0.00	9.52	25.00	4.76	20.00
Insurance	16.67	5.00	0.00	8.33	11.11	4.76	0.00	14.29	0.00
Manufacturing	0.00	0.00	0.00	8.33	11.11	14.29	0.00	14.29	60.00
Mathematics/Statistics	0.00	0.00	0.00	8.33	0.00	9.52	25.00	23.81	20.00
Order Processing/Inventory Control	16.67	25.00	42.86	25.00	22.22	47.62	12.50	47.62	80.00
Payroll/Personnel	50.00	45.00	57.14	58.33	33.33	47.62	50.00	52.38	80.00
Petroleum/Fuel analysis	0.00	0.00	0.00	8.33	0.00	0.00	0.00	4.76	20.00
Process control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Purchasing	33.33	10.00	0.00	25.00	33.33	19.05	62.50	33.33	100.00
Sales Distribution	33.33	10.00	42.86	8.33	22.22	23.81	12.50	23.81	80.00
Other	33.33	20.00	57.14	16.67	33.33	28.57	37.50	23.81	20.00
Source of Applications Programs (%)									
In-house personnel	100.00	80.00	71.43	91.67	100.00	100.00	100.00	100.00	100.00
"Ready-made" programs from manufacturer	16.67	15.00	28.57	41.67	22.22	38.10	12.50	28.57	20.00
Contract Programming	33.33	5.00	14.29	33.33	11.11	28.57	12.50	47.62	20.00
Manufacturer's Personnel	0.00	5.00	0.00	8.33	0.00	9.52	12.50	4.76	0.00
Proprietary Software Packages	33.33	30.00	28.57	75.00	11.11	57.14	25.00	47.62	40.00
Location of Computer (%)									
Distributed Processing Site	0.00	10.00	0.00	0.00	0.00	5.00	0.00	4.76	0.00
Central Processing Installation	100.00	90.00	100.00	100.00	100.00	95.00	100.00	95.24	100.00
Using Local Workstations/Terminals (%)	83.33	95.00	100.00	100.00	100.00	95.24	87.50	100.00	100.00
Using Remote Workstations/Terminals (%)	83.33	55.00	57.15	91.67	33.33	80.94	87.50	95.24	100.00
Using Data Base Management System (%)	16.67	30.00	28.57	33.33	44.44	42.86	62.50	76.19	100.00
None	83.33	65.00	71.43	66.67	55.56	57.14	37.50	23.81	0.00
Manufacturer's Package	100.00	100.00	100.00	100.00	75.00	87.50	100.00	100.00	100.00
Outside Vendor's Package	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Home-Grown System	0.00	0.00	0.00	0.00	25.00	12.50	0.00	0.00	0.00
Using Communications Monitor (%)	66.67	55.00	71.43	50.00	55.56	71.43	75.00	95.24	100.00
None	33.33	45.00	28.57	50.00	44.44	23.81	12.50	4.76	0.00
Manufacturer's Package	100.00	100.00	100.00	100.00	40.00	60.00	66.67	70.00	80.00
Outside Vendor's Package	0.00	0.00	0.00	0.00	20.00	26.67	0.00	5.00	0.00
Home-Grown System	0.00	0.00	0.00	0.00	40.00	13.33	33.33	25.00	20.00
Using Integrated Word Processing Functions (%)	0.00	0.00	0.00	8.33	0.00	4.76	12.50	23.81	20.00
Planned Acquisitions/Implementations for 1981 (%)									
Additional Software from the Manufacturer	16.67	10.00	42.86	41.67	55.56	42.86	12.50	33.33	40.00
Proprietary Software from other suppliers	16.67	35.00	57.14	58.33	22.22	61.90	0.00	38.10	40.00
Expansions to Data Communications facilities	50.00	30.00	42.86	75.00	55.56	66.67	87.50	33.33	60.00
Distributed Processing capabilities	0.00	0.00	42.86	8.33	11.11	23.81	25.00	14.29	60.00
Expansions to present hardware	16.67	45.00	71.43	50.00	55.56	57.14	62.50	42.86	60.00
Another Computer System, same model	0.00	0.00	14.29	8.33	0.00	4.76	0.00	9.52	20.00
Integrated Word Processing capabilities	0.00	5.00	0.00	0.00	22.22	9.52	37.50	0.00	60.00
Plans for system replacement in 1981 (%)									
Yes same manufacturer	50.00	25.00	42.86	8.33	44.44	4.76	37.50	0.00	0.00
Yes, vendor unknown	0.00	5.00	0.00	0.00	11.11	0.00	12.50	0.00	0.00
Yes, different vendor	0.00	0.00	14.29	0.00	0.00	4.76	0.00	4.76	0.00
No	50.00	70.00	28.57	91.67	44.44	90.48	50.00	95.24	100.00

Burroughs B 2700	Burroughs B 2800	Burroughs B 3700	Burroughs B 3800	Burroughs B 4700	Burroughs B 4800	Burroughs B 6700	Burroughs B 6800	Burroughs B 7800	Manufacturer and Model / Survey Item
									Significant Advantages (%)
16.67	40.00	42.86	58.33	33.33	57.14	37.50	66.67	40.00	Users are happy with response time
50.00	75.00	85.71	83.33	66.67	85.71	62.50	85.71	80.00	System is easy to expand/reconfigure
33.33	25.00	28.57	33.33	11.11	14.29	12.50	9.52	20.00	System costs were less than expected
16.67	60.00	71.43	100.00	66.67	76.19	12.50	28.57	80.00	Programs/data carried over from other systems are compatible, as vendor promised
16.67	35.00	42.86	75.00	66.67	66.67	25.00	47.62	40.00	Terminals/peripherals carried over from other systems are compatible, as vendor promised
0.00	20.00	14.29	33.33	0.00	23.81	0.00	9.52	0.00	System is power/energy efficient
50.00	25.00	57.14	25.00	33.33	23.81	50.00	42.86	20.00	Productivity aids help us keep programming costs down
0.00	25.00	14.29	16.67	33.33	9.52	50.00	71.43	60.00	Data base language is efficient and effective
0.00	15.00	0.00	16.67	11.11	0.00	12.50	4.76	0.00	Delivery and/or installation of equipment was ahead of schedule
0.00	5.00	0.00	0.00	0.00	0.00	0.00	9.52	0.00	Delivery of required software was ahead of schedule
									Significant Problems (%)
0.00	0.00	0.00	0.00	0.00	4.76	25.00	14.29	20.00	Computer proposed by vendor was too small
16.67	50.00	42.86	50.00	11.11	85.71	12.50	28.57	0.00	Installation of equipment was late
16.67	0.00	0.00	0.00	0.00	23.81	12.50	14.29	0.00	Delivery of required software was late
0.00	0.00	0.00	0.00	0.00	14.29	25.00	14.29	0.00	System costs (for hardware, vendor-supplied software, support) exceeded the expected total
0.00	25.00	14.29	8.33	0.00	28.57	25.00	28.57	0.00	Vendor did not provide all the promised software or support
0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.76	0.00	Program/data compatibility not what vendor promised
0.00	5.00	0.00	0.00	0.00	4.76	0.00	9.52	0.00	Terminals/peripherals compatibility not what vendor promised
0.00	5.00	0.00	8.33	11.11	9.52	0.00	9.52	0.00	Vendor enhancements/changes to hardware/software hard to keep up with
33.33	5.00	28.57	0.00	22.22	9.52	12.50	4.76	0.00	Equipment is excessively noisy
33.33	15.00	42.86	0.00	55.56	9.52	37.50	14.29	0.00	Power and/or cooling requirements are excessive
									System Ratings (4.0-0.0)
3.67	3.55	3.86	3.83	3.67	3.67	3.88	3.38	3.80	Ease of operation
3.33	3.55	3.43	3.58	3.33	3.45	3.13	3.33	3.60	Reliability of Mainframe
2.50	2.80	2.71	2.75	2.78	2.57	2.88	2.48	3.00	Reliability of Peripherals
									Maintenance service:
2.67	2.90	2.57	3.00	2.67	2.76	3.00	2.86	3.20	Responsiveness
2.67	2.65	2.57	2.75	2.89	2.43	2.75	2.38	3.00	Effectiveness
									Technical support:
2.17	2.15	2.43	2.42	2.78	2.10	2.50	2.40	2.80	Trouble-shooting
2.17	2.16	2.14	2.08	2.78	1.95	2.38	2.24	2.20	Education
2.00	2.15	2.00	2.08	2.67	2.00	2.63	1.86	2.60	Documentation
									Manufacturer's software:
3.83	3.70	4.00	3.75	3.67	3.67	3.88	3.71	3.80	Operating system
3.00	3.30	3.43	3.42	3.67	3.24	3.88	3.38	3.80	Compilers & Assemblers
2.25	2.83	2.33	2.36	2.86	2.47	2.67	2.40	2.67	Applications Programs
3.50	3.55	3.67	3.55	3.67	3.48	3.88	3.43	3.60	Ease of programming
2.80	3.29	2.86	3.70	3.22	3.33	3.57	3.05	3.50	Ease of conversion
3.00	3.30	3.14	3.25	3.33	3.05	3.25	2.90	3.20	Overall satisfaction
									Did the system do what you expected it to do? (%)
100.00	95.00	100.00	100.00	100.00	90.48	87.50	71.43	100.00	Yes
0.00	5.00	0.00	0.00	0.00	9.52	12.50	9.52	0.00	No
0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.05	0.00	Haven't decided
									Would you recommend system to another user? (%)
66.67	90.00	100.00	91.67	66.67	85.71	75.00	66.67	80.00	Yes
33.33	5.00	0.00	0.00	22.22	9.52	25.00	19.05	0.00	No
0.00	5.00	0.00	8.33	11.11	4.76	0.00	14.29	20.00	Haven't decided

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DELTAVISION

Computer Enhanced Multimedia Training from DELTAK

A New Era in DP Training-DELTAK, the productivity company, announces an exciting new concept in DP education — *Computer Enhanced Multimedia Training*. DELTAK is adding a powerful new dimension to its DeltaVision Library of multimedia training programs by introducing the computer as a fourth instructional medium, integrating it with video, audio and text materials. On an ongoing basis, DELTAK is converting its existing library of more than 800 multimedia DP training programs to Computer Enhanced Multimedia courseware, dramatically increasing its *cost-effectiveness* and *learning productivity*.

Benefits-DELTAK's Computer Enhanced Multimedia Training systems bring many benefits to the organization seeking to improve the productivity of its DP training program.

- *Compression:* Decreases the time required to learn by 30 percent, significantly reducing the most expensive training cost — student time.
- *Cost Reduction:* Dramatically reduces instructor/tutor time, reducing costs and freeing senior personnel to work on critical systems projects.
- *Retention:* Significantly increases students' retention of course material.
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- *Simulation:* Simulates real-world DP situations.
- *Validation:* Provides unbiased validation of students' mastery of skills.
- *Consistency:* Ensures a uniform level of skills mastery by all students.
- *Administration:* Automates student enrollment, record keeping and reporting, enhancing the overall management of the training program.

Two Delivery Systems-*IIS/DeltaVision* features courseware developed with IBM's Interactive Instructional System (IIS) and uses IBM 3270 terminals linked to a large-scale computer. *Micro/DeltaVision* features courseware developed with the Professional Authoring Software System (PASS), created by Bell & Howell, and uses a stand-alone APPLE II microprocessor. Both IIS/DeltaVision and Micro/DeltaVision incorporate text, audio and video with computer-presented instruction, creating an *integrated, four-media* training system.

IIS/DV Courses in Development
3270 Operator Training
MVS/SPF Program Development
CICS Application Design
CICS/VS Command-Level Programming
CICS/VS-DL/I Interface (Command Level)
MVS-JES2 Operator Training
VTAM Network Control

MICRO/DV Courses in Development
Structured ANS COBOL – Entry Level
MVS Job Control Language
VS-OS Utility Programs
MVS-JES2/JES3 Debugging
VSE for Application Programmers
VSAM (MVS and VSE)
System Development
Project Management

Demonstrations-See DELTAK's new Computer Enhanced Multimedia Training systems demonstrated at the National Computer Conference, May 4-7, McCormick Place, Chicago (Booth #1313).

DELTAK, inc.
1220 Kensington Road
Oak Brook, Illinois 60521
Phone: (312) 920-0700
Attn: Ms. Patti Schwartz

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Manufacturer and Model Survey Item	Burroughs (other models)	Control Data Cyber 170	Control Data Omega 480	Control Data (other models)	DEC DECsystem-10	DEC DECSYSTEM-20	Honeywell Level 62	Honeywell Level 64	Honeywell Level 66
No. of User Responses	10	12	9	8	15	24	54	27	32
No. of Systems Represented	11	15	14	11	22	27	58	28	39
Avg. Life of System (Mos.)	25.3	18.1	21.1	59.8	59.7	26.3	35.3	31.0	37.5
Acquisition Method (%)									
Purchase	50.00	33.33	88.89	100.00	80.00	83.33	37.04	55.56	59.38
Rental or Lease from Mfr	50.00	66.67	11.11	0.00	6.67	0.00	57.41	40.74	25.00
Lease from 3rd Party	0.00	0.00	0.00	0.00	13.33	16.67	5.55	3.70	15.62
Principal Applications (%)									
Accounting/Billing	60.00	75.00	55.56	62.50	73.33	79.17	88.89	92.59	90.63
Banking-check processing/loans/savings	10.00	0.00	22.22	12.50	0.00	4.17	9.26	7.41	9.38
Construction/Architecture	0.00	16.67	11.11	12.50	0.00	8.33	5.56	0.00	9.38
Education-scheduling/administration	20.00	58.33	0.00	50.00	66.67	29.17	3.70	3.70	21.88
Engineering/Scientific	20.00	58.33	11.11	62.50	26.67	37.50	5.56	3.70	9.38
Health care/Medical	0.00	8.33	11.11	0.00	20.00	8.33	7.41	11.11	9.38
Insurance	10.00	0.00	22.22	0.00	0.00	4.17	3.70	0.00	3.13
Manufacturing	0.00	16.67	11.11	12.50	13.33	12.50	27.78	37.04	21.88
Mathematics/Statistics	30.00	41.67	0.00	50.00	53.33	41.67	5.56	7.41	21.88
Order Processing/Inventory Control	40.00	33.33	33.33	25.00	33.33	37.50	62.96	62.96	18.75
Payroll/Personnel	60.00	58.33	55.56	25.00	66.67	45.83	62.96	81.48	75.00
Petroleum/Fuel analysis	0.00	0.00	0.00	0.00	0.00	4.17	3.70	3.70	0.00
Process control	0.00	8.33	11.11	12.50	6.67	0.00	3.70	0.00	0.00
Purchasing	30.00	16.67	33.33	37.50	26.67	29.17	37.04	25.93	46.88
Sales Distribution	0.00	16.67	11.11	25.00	6.67	20.83	59.26	48.15	28.13
Other	40.00	0.00	11.11	25.00	40.00	33.33	16.67	44.44	15.63
Source of Applications Programs (%)									
In-house personnel	90.00	100.00	88.89	100.00	100.00	100.00	94.44	100.00	100.00
"Ready-made" programs from manufacturer	40.00	33.33	22.22	37.50	20.00	29.17	31.48	40.74	34.38
Contract Programming	50.00	8.33	33.33	37.50	20.00	45.83	37.04	22.22	31.25
Manufacturer's Personnel	20.00	16.67	0.00	25.00	6.67	12.50	14.81	7.41	21.88
Proprietary Software Packages	20.00	50.00	44.44	37.50	46.67	58.33	14.81	29.63	46.88
Location of Computer (%)									
Distributed Processing Site	0.00	8.33	0.00	0.00	6.67	4.17	1.85	3.70	0.00
Central Processing Installation	100.00	91.67	100.00	100.00	93.33	95.83	98.15	96.30	100.00
Using Local Workstations/Terminals (%)	100.00	100.00	100.00	100.00	93.33	100.00	83.33	92.59	96.88
Using Remote Workstations/Terminals (%)	50.00	91.67	77.78	75.00	86.67	91.67	98.15	100.00	96.88
Using Data Base Management System (%)	60.00	58.33	77.78	37.50	60.00	50.00	20.37	18.52	78.13
None	40.00	41.67	22.22	62.50	40.00	45.83	79.63	81.48	21.87
Manufacturer's Package	50.00	85.71	14.29	33.33	42.86	50.00	54.55	60.00	100.00
Outside Vendor's Package	16.67	0.00	71.43	66.67	14.29	50.00	18.18	20.00	0.00
Home-Grown System	33.33	14.29	14.29	0.00	42.86	0.00	27.27	20.00	0.00
Using Communications Monitor (%)	60.00	75.00	100.00	62.50	40.00	50.00	62.96	59.26	65.63
None	40.00	25.00	0.00	37.50	60.00	45.83	33.33	37.04	31.25
Manufacturer's Package	83.33	88.89	11.11	40.00	50.00	91.67	76.47	87.50	66.67
Outside Vendor's Package	0.00	11.11	66.67	40.00	16.67	8.33	14.71	6.25	19.05
Home-Grown System	16.67	0.00	22.22	20.00	33.33	0.00	18.82	6.25	14.28
Using Integrated Word Processing Functions (%)	20.00	0.00	11.11	0.00	40.00	33.33	0.00	0.00	6.25
Planned Acquisitions/Implementations for 1981 (%)									
Additional Software from the Manufacturer	50.00	33.33	33.33	12.50	20.00	4.17	11.11	33.33	50.00
Proprietary Software from other suppliers	0.00	25.00	66.67	12.50	40.00	54.17	7.41	29.63	28.13
Expansions to Data Communications facilities	40.00	66.67	55.56	37.50	40.00	41.67	46.30	55.56	68.75
Distributed Processing capabilities	20.00	8.33	11.11	0.00	20.00	16.67	18.52	18.52	31.25
Expansions to present hardware	30.00	58.33	55.56	50.00	53.33	62.50	50.00	48.15	65.63
Another Computer System, same model	0.00	16.67	0.00	12.50	6.67	4.17	0.00	0.00	3.13
Integrated Word Processing capabilities	40.00	0.00	0.00	12.50	20.00	20.83	1.85	11.11	3.13
Plans for system replacement in 1981 (%)									
Yes, same manufacturer	10.00	25.00	0.00	0.00	13.33	4.17	9.26	7.41	12.50
Yes, vendor unknown	0.00	0.00	0.00	12.50	26.67	0.00	5.56	0.00	0.00
Yes, different vendor	0.00	8.33	22.22	0.00	0.00	0.00	3.70	7.41	3.13
No	90.00	66.67	77.78	87.50	60.00	95.83	81.48	85.19	84.37

Burroughs (other models)	Control Data Cyber 170	Control Data Omega 480	Control Data (other models)	DEC DECsystem-10	DEC DECSYSTEM-20	Honeywell Level 62	Honeywell Level 64	Honeywell Level 66	Manufacturer and Model Survey Item
									Significant Advantages (%)
50.00	83.33	33.33	87.50	73.33	66.67	53.70	37.04	62.50	Users are happy with response time
66.67	66.67	55.56	75.00	53.33	70.83	53.70	62.96	71.88	System is easy to expand/reconfigure
33.33	8.33	44.44	0.00	6.67	16.67	18.52	14.81	6.25	System costs were less than expected
66.67	33.33	77.78	37.50	46.67	29.17	35.19	44.44	37.50	Programs/data carried over from other systems are compatible, as vendor promised
66.67	41.67	77.78	25.00	46.67	33.33	3.70	33.33	18.75	Terminals/peripherals carried over from other systems are compatible, as vendor promised
20.00	25.00	77.78	12.50	6.67	12.50	9.26	18.52	9.38	System is power/energy efficient
0.00	33.33	0.00	25.00	60.00	75.00	9.26	29.63	25.00	Productivity aids help us keep programming costs down
33.33	16.67	0.00	12.50	13.33	33.33	11.11	11.11	28.13	Data base language is efficient and effective
0.00	0.00	22.22	0.00	13.33	16.67	11.11	14.81	25.00	Delivery and/or installation of equipment was ahead of schedule
0.00	8.33	0.00	0.00	13.33	12.50	5.56	7.41	3.13	Delivery of required software was ahead of schedule
									Significant Problems (%)
10.00	0.00	0.00	0.00	0.00	8.33	11.11	3.70	9.38	Computer proposed by vendor was too small
33.33	16.67	11.11	0.00	0.00	12.50	16.67	11.11	15.63	Installation of equipment was late
10.00	0.00	0.00	0.00	6.67	8.33	14.81	18.52	15.63	Delivery of required software was late
0.00	0.00	0.00	0.00	0.00	4.17	18.52	7.41	25.00	System costs (for hardware, vendor-supplied software, support) exceeded the expected total
10.00	8.33	44.44	0.00	6.67	20.83	33.33	14.81	18.75	Vendor did not provide all the promised software or support
0.00	0.00	0.00	0.00	0.00	4.17	12.96	7.41	6.25	Program/data compatibility not what vendor promised
0.00	0.00	22.22	0.00	0.00	0.00	3.70	11.11	9.38	Terminals/peripherals compatibility not what vendor promised
33.33	25.00	0.00	12.50	13.33	4.17	20.37	7.41	18.75	Vendor enhancements/changes to hardware/software hard to keep up with
0.00	0.00	0.00	0.00	13.33	16.67	11.11	11.11	12.50	Equipment is excessively noisy
0.00	16.67	0.00	37.50	26.67	8.33	9.26	11.11	15.63	Power and/or cooling requirements are excessive
									System Ratings (4.0-0.0)
3.60	3.17	3.33	3.38	3.73	3.83	3.26	3.33	3.26	Ease of operation
3.50	3.67	2.56	3.63	3.47	3.42	3.30	3.41	3.60	Reliability of Mainframe
3.33	3.08	2.38	3.25	2.87	3.04	3.06	3.15	3.03	Reliability of Peripherals
									Maintenance service:
3.10	3.42	2.78	3.75	3.29	3.25	3.22	3.07	2.97	Responsiveness
3.10	3.18	2.25	3.38	2.93	3.25	2.98	3.00	2.63	Effectiveness
									Technical support:
2.80	2.83	2.78	2.88	2.69	2.63	2.52	2.73	2.52	Trouble-shooting
3.00	2.73	1.86	2.57	2.82	2.63	2.20	2.63	2.50	Education
2.60	2.75	2.25	2.50	2.53	2.74	2.11	2.52	2.41	Documentation
									Manufacturer's software:
3.56	3.17	3.00	2.88	3.50	3.63	3.19	3.33	3.52	Operating system
3.11	3.17	3.00	3.00	3.13	3.17	3.21	3.26	3.20	Compilers & Assemblers
2.75	2.78	2.67	2.80	2.40	2.60	2.47	2.35	2.80	Applications Programs
3.44	3.00	3.00	3.13	3.73	3.70	2.98	3.23	3.19	Ease of programming
3.33	3.20	3.40	3.00	3.54	3.29	2.60	2.88	2.83	Ease of conversion
3.40	3.17	2.67	3.38	3.47	3.48	2.85	3.07	3.13	Overall satisfaction
									Did the system do what you expected it to do? (%)
80.00	91.67	88.89	100.00	100.00	95.83	75.96	74.07	90.63	Yes
0.00	8.33	0.00	0.00	0.00	4.17	11.11	11.11	6.25	No
20.00	0.00	11.11	0.00	0.00	0.00	9.26	14.81	3.12	Haven't decided
									Would you recommend system to another user? (%)
80.00	83.33	66.67	75.00	86.67	83.33	44.44	74.07	71.88	Yes
0.00	16.67	22.22	12.50	13.33	12.50	27.78	22.22	12.50	No
20.00	0.00	11.11	12.50	0.00	0.00	22.22	3.70	9.38	Haven't decided

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Users Rate Their Mainframes . . .

Survey Item / Manufacturer and Model	Honeywell Series 2000	Honeywell Series 6000	Honeywell, Xerox Sigma Series	Honeywell (other models)	IBM 360/20	IBM 360/30	IBM 360/40	IBM 360/50	IBM 360/65
No. of User Responses	17	12	7	14	5	14	20	11	5
No. of Systems Represented	17	16	8	16	5	14	20	14	7
Avg. Life of System (Mos.)	76.2	61.6	87.0	57.2	143.8	83.0	33.8	51.9	73.4
Acquisition Method (%)									
Purchase	94.12	45.45	71.43	85.71	80.00	71.43	63.16	36.36	80.00
Rental or Lease from Mfr	5.88	36.36	14.29	14.29	20.00	0.00	0.00	0.00	20.00
Lease from 3rd Party	0.00	18.18	14.29	0.00	0.00	28.57	36.84	63.64	0.00
Principal Applications (%)									
Accounting/Billing	100.00	58.33	42.86	85.71	100.00	85.71	65.00	81.82	60.00
Banking/check processing/loans/savings	0.00	8.33	14.29	7.14	20.00	14.29	20.00	9.09	0.00
Construction/Architecture	0.00	8.33	0.00	7.14	0.00	0.00	15.00	0.00	20.00
Education/scheduling/administration	17.65	33.33	57.14	28.57	0.00	14.29	5.00	9.09	40.00
Engineering/Scientific	5.88	25.00	14.29	21.43	0.00	7.14	10.00	18.18	20.00
Health care/Medical	0.00	25.00	0.00	7.14	20.00	14.29	10.00	0.00	20.00
Insurance	17.65	8.33	0.00	0.00	0.00	14.29	15.00	0.00	0.00
Manufacturing	17.65	16.67	14.29	14.29	0.00	35.71	20.00	18.18	0.00
Mathematics/Statistics	5.88	25.00	42.86	21.43	0.00	14.29	5.00	9.09	40.00
Order Processing/Inventory Control	58.82	33.33	0.00	35.71	40.00	50.00	35.00	45.45	80.00
Payroll/Personnel	76.47	75.00	57.14	71.43	40.00	71.43	55.00	45.45	60.00
Petroleum/Fuel analysis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Process control	0.00	16.67	14.29	0.00	0.00	0.00	10.00	0.00	20.00
Purchasing	35.29	33.33	14.29	50.00	20.00	14.29	25.00	18.18	40.00
Sales Distribution	47.06	16.67	14.29	28.57	40.00	42.86	30.00	18.18	0.00
Other	11.76	41.67	14.29	35.71	0.00	28.57	20.00	9.09	0.00
Source of Applications Programs (%)									
In-house personnel	94.12	91.67	85.71	92.86	100.00	100.00	95.00	100.00	80.00
"Ready-made" programs from manufacturer	35.29	16.67	42.86	28.57	20.00	7.14	0.00	9.09	40.00
Contract Programming	17.65	33.33	0.00	35.71	20.00	21.43	45.00	27.27	40.00
Manufacturer's Personnel	11.76	8.33	14.29	14.29	0.00	0.00	0.00	0.00	0.00
Proprietary Software Packages	5.88	41.67	28.57	28.57	0.00	35.71	20.00	45.45	40.00
Location of Computer (%)									
Distributed Processing Site	0.00	0.00	0.00	0.00	20.00	0.18	0.00	0.00	20.00
Central Processing Installation	100.00	100.00	100.00	100.00	80.00	1.08	100.00	100.00	80.00
Using Local Workstations/Terminals (%)	23.53	100.00	100.00	64.29	0.00	42.86	45.00	36.36	60.00
Using Remote Workstations/Terminals (%)	100.00	100.00	100.00	100.00	0.00	35.71	20.00	45.45	60.00
Using Data Base Management System (%)	11.76	66.67	71.43	28.57	0.00	14.29	15.00	9.09	20.00
None	88.24	33.33	28.57	71.43	100.00	85.71	85.00	90.91	80.00
Manufacturer's Package	0.00	87.50	60.00	75.00	0.00	0.00	33.33	0.00	100.00
Outside Vendor's Package	100.00	0.00	20.00	0.00	0.00	100.00	67.67	0.00	0.00
Home-Grown System	0.00	12.50	20.00	25.00	0.00	0.00	0.00	100.00	0.00
Using Communications Monitor (%)	11.76	58.33	71.43	35.71	0.00	21.43	20.00	27.27	60.00
None	88.24	41.67	28.57	64.29	100.00	78.57	80.00	72.73	40.00
Manufacturer's Package	100.00	71.43	80.00	100.00	0.00	33.33	25.00	33.33	100.00
Outside Vendor's Package	0.00	0.00	20.00	0.00	0.00	66.67	75.00	33.33	0.00
Home-Grown System	0.00	28.57	0.00	0.00	0.00	0.00	0.00	33.33	0.00
Using Integrated Word Processing Functions (%)	0.00	8.33	57.14	0.00	0.00	0.00	5.00	0.00	20.00
Planned Acquisitions/Implementations for 1981 (%)									
Additional Software from the Manufacturer	23.53	16.67	0.00	28.57	0.00	14.29	20.00	9.09	0.00
Proprietary Software from other suppliers	5.88	8.33	28.57	21.43	0.00	14.29	20.00	54.55	40.00
Expansions to Data Communications facilities	23.53	50.00	42.86	42.86	0.00	28.57	40.00	36.36	40.00
Distributed Processing capabilities	17.65	25.00	0.00	21.43	0.00	14.29	15.00	9.09	0.00
Expansions to present hardware	17.65	41.67	57.14	7.14	0.00	7.14	35.00	0.00	40.00
Another Computer System, same model	5.88	8.33	14.29	7.14	0.00	7.14	0.00	9.09	0.00
Integrated Word Processing capabilities	5.88	8.33	0.00	7.14	0.00	7.14	5.00	0.00	0.00
Plans for system replacement in 1981 (%)									
Yes, same manufacturer	17.65	8.33	0.00	0.00	40.00	42.86	30.00	45.45	20.00
Yes, vendor unknown	5.88	0.00	14.29	28.57	20.00	21.43	10.00	9.09	40.00
Yes, different vendor	29.41	16.67	0.00	28.57	0.00	7.14	0.00	9.09	0.00
No	47.06	75.00	85.71	35.71	40.00	28.57	55.00	36.36	40.00

Honeywell Series 2000	Honeywell Series 6000	Honeywell, Xerox Sigma Series	Honeywell (other models)	IBM 360/20	IBM 360/30	IBM 360/40	IBM 360/50	IBM 360/65	Manufacturer and Model / Survey Item
									Significant Advantages (%)
17.65	25.00	71.43	21.43	20.00	35.71	45.00	18.18	40.00	Users are happy with response time
5.88	25.00	57.14	21.43	20.00	35.71	25.00	9.09	20.00	System is easy to expand/reconfigure
23.53	16.67	28.57	21.43	0.00	28.57	30.00	9.09	0.00	System costs were less than expected
23.53	25.00	28.57	14.29	20.00	42.86	50.00	27.27	20.00	Programs/data carried over from other systems are compatible, as vendor promised
5.88	25.00	28.57	14.29	0.00	14.29	0.00	9.09	0.00	Terminals/peripherals carried over from other systems are compatible, as vendor promised
0.00	8.33	0.00	7.14	0.00	14.29	10.00	0.00	20.00	System is power/energy efficient
0.00	8.33	42.86	14.29	0.00	14.29	10.00	0.00	0.00	Productivity aids help us keep programming costs down
0.00	25.00	28.57	7.14	0.00	7.14	10.00	0.00	20.00	Data base language is efficient and effective
0.00	8.33	0.00	7.14	0.00	14.29	25.00	0.00	0.00	Delivery and/or installation of equipment was ahead of schedule
0.00	0.00	0.00	7.14	0.00	7.14	10.00	0.00	0.00	Delivery of required software was ahead of schedule
									Significant Problems (%)
11.76	8.33	14.29	21.43	0.00	0.00	10.00	0.00	0.00	Computer proposed by vendor was too small
5.88	0.00	14.29	7.14	0.00	0.00	0.00	9.09	0.00	Installation of equipment was late
0.00	25.00	14.29	0.00	0.00	7.14	0.00	0.00	0.00	Delivery of required software was late
5.88	16.67	14.29	7.14	0.00	0.00	5.00	9.09	20.00	System costs (for hardware, vendor-supplied software, support) exceeded the expected total
5.88	33.33	28.57	21.43	0.00	14.29	5.00	9.09	0.00	Vendor did not provide all the promised software or support
5.88	16.67	14.29	0.00	0.00	0.00	0.00	0.00	0.00	Program/data compatibility not what vendor promised
0.00	16.67	0.00	7.14	0.00	0.00	0.00	0.00	0.00	Terminals/peripherals compatibility not what vendor promised
5.88	33.33	0.00	0.00	0.00	0.00	0.00	18.18	0.00	Vendor enhancements/changes to hardware/software hard to keep up with
23.53	8.33	14.29	28.57	0.00	0.00	10.00	9.09	0.00	Equipment is excessively noisy
41.18	16.67	42.86	21.43	0.00	14.29	25.00	45.45	60.00	Power and/or cooling requirements are excessive
									System Ratings (4.0-0.0)
2.94	3.08	3.86	2.79	2.40	3.00	3.16	2.91	3.50	Ease of operation
3.18	2.92	2.71	2.93	3.60	3.00	3.15	2.91	3.40	Reliability of Mainframe
2.94	2.33	2.43	2.79	2.80	2.86	2.65	2.82	2.60	Reliability of Peripherals
									Maintenance service:
2.88	3.00	2.43	2.71	2.80	2.71	3.10	2.82	3.40	Responsiveness
2.94	2.67	2.29	2.57	3.00	2.92	3.05	2.56	3.00	Effectiveness
									Technical support:
2.71	2.45	2.14	2.31	2.50	2.75	2.50	2.56	3.25	Trouble-shooting
2.35	2.42	1.71	1.85	2.00	2.75	2.55	2.75	3.60	Education
2.53	2.33	2.43	1.92	2.25	2.85	2.82	2.89	3.60	Documentation
									Manufacturer's software:
2.82	2.83	3.86	2.93	2.60	3.14	2.89	3.13	2.80	Operating system
2.94	2.67	3.43	2.86	2.80	3.15	3.11	3.00	3.60	Compilers & Assemblers
2.20	2.33	2.50	2.00	2.33	3.00	2.90	2.50	3.00	Applications Programs
2.76	2.64	3.43	3.07	2.20	2.93	2.80	2.70	3.60	Ease of programming
2.54	2.40	2.86	2.00	2.00	3.00	2.69	3.10	3.40	Ease of conversion
2.76	2.33	3.00	2.71	2.60	2.79	2.95	2.70	3.20	Overall satisfaction
									Did the system do what you expected it to do? (%)
82.35	58.33	85.71	78.57	100.00	85.71	95.00	100.00	100.00	Yes
11.76	16.67	0.00	14.29	0.00	14.29	5.00	0.00	0.00	No
5.88	25.00	14.29	7.14	0.00	0.00	0.00	0.00	0.00	Haven't decided
									Would you recommend system to another user? (%)
35.29	41.67	71.43	42.86	0.00	64.29	55.00	54.55	60.00	Yes
47.06	33.33	28.57	50.00	60.00	35.71	35.00	45.45	40.00	No
5.88	25.00	0.00	7.14	20.00	0.00	5.00	0.00	0.00	Haven't decided

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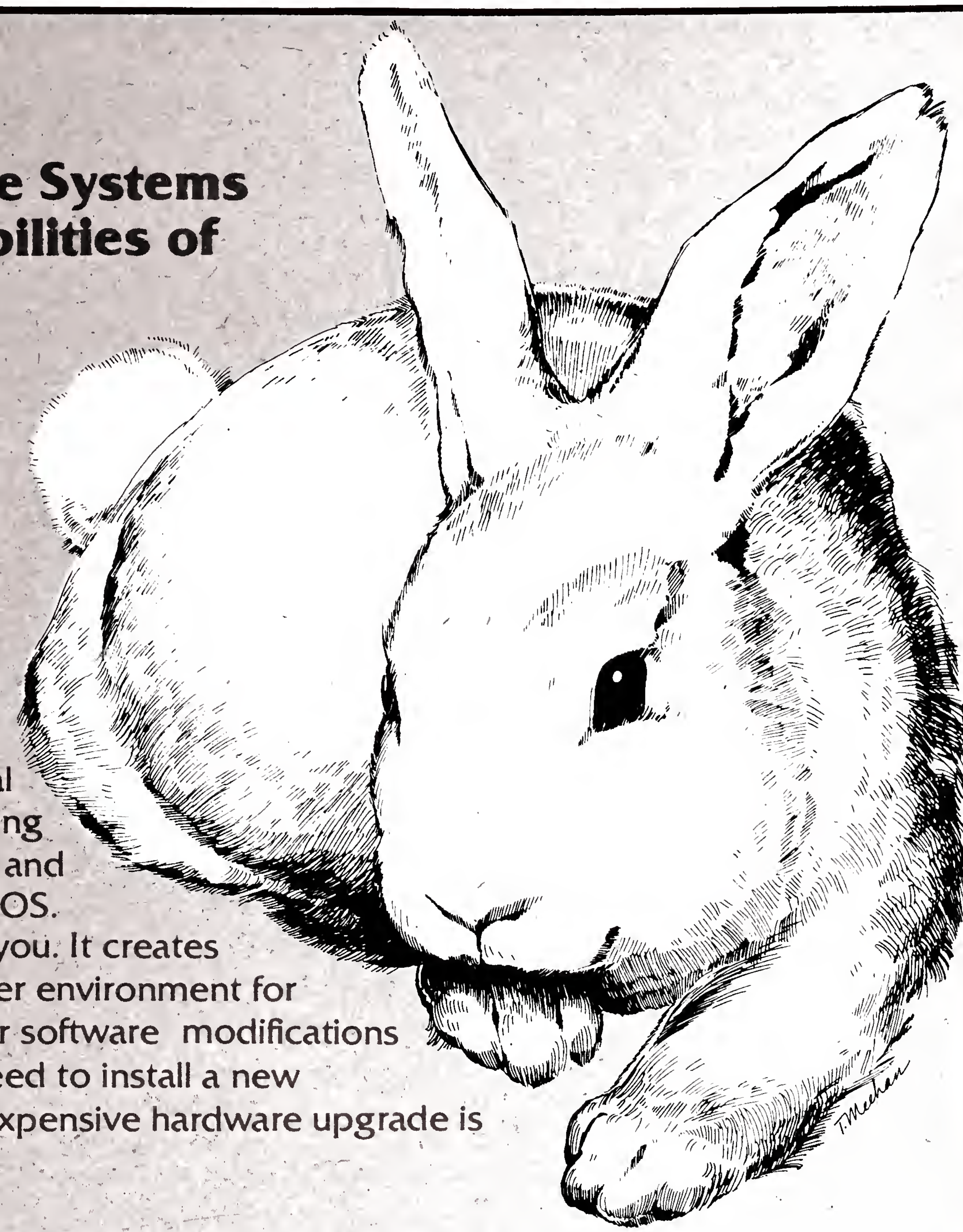

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From Amdahl to Univac . . .

Survey Item \ Manufacturer and Model	IBM 370/115	IBM 370/125	IBM 370/135	IBM 370/138	IBM 370/145	IBM 370/148	IBM 370/155	IBM 370/158	IBM 370/168
No. of User Responses	9	20	44	96	38	75	21	110	56
No. of Systems Represented	9	20	47	100	41	80	22	141	73
Avg. Life of System (Mos.)	62.0	58.2	54.9	29.5	29.1	32.2	32.9	34.5	28.4
Acquisition Method (%)									
Purchase	33.33	75.00	52.27	38.54	39.47	42.67	76.19	26.61	35.71
Rental or Lease from Mfr.	22.22	10.00	4.55	19.79	0.00	10.67	0.00	8.26	7.14
Lease from 3rd Party	44.44	15.00	43.18	41.67	60.53	46.67	23.81	65.14	57.14
Principal Applications (%)									
Accounting/Billing	100.00	95.00	84.09	80.21	78.95	78.67	80.95	73.64	73.21
Banking check processing loans/savings	0.00	20.00	13.64	12.50	18.42	13.33	19.05	13.64	14.29
Construction Architecture	11.11	5.00	0.00	1.04	0.00	0.00	0.00	4.55	5.36
Education-scheduling/administration	11.11	5.00	6.82	9.38	13.16	12.00	14.29	12.73	10.71
Engineering/Scientific	11.11	5.00	11.36	6.25	7.89	8.00	9.52	18.18	32.14
Health care/Medical	0.00	15.00	4.55	5.21	5.26	13.33	9.52	13.64	16.07
Insurance	11.11	0.00	18.18	9.38	5.26	10.67	9.52	12.73	21.43
Manufacturing	55.56	20.00	34.09	34.38	36.84	36.00	23.81	26.36	12.50
Mathematics/Statistics	0.00	5.00	9.09	5.21	2.63	12.00	9.52	20.91	41.07
Order Processing/Inventory Control	77.78	55.00	65.91	55.21	55.26	54.67	52.38	49.09	42.86
Payroll/Personnel	88.89	80.00	70.45	64.58	71.05	70.67	57.14	61.82	64.29
Petroleum/Fuel analysis	0.00	0.00	0.00	0.00	2.63	1.33	0.00	5.45	5.36
Process control	0.00	0.00	4.55	4.17	5.26	1.33	0.00	3.64	3.57
Purchasing	77.78	40.00	31.82	27.08	26.32	32.00	23.81	27.27	39.29
Sales Distribution	55.56	45.00	38.64	46.88	39.47	41.33	33.33	36.36	19.64
Other	11.11	15.00	13.64	16.67	21.05	16.00	4.76	25.45	42.86
Source of Applications Programs (%)									
In-house personnel	100.00	90.00	95.45	94.79	97.37	98.67	95.24	95.48	100.00
"Ready-made" programs from manufacturer	0.00	40.00	25.00	29.17	26.32	41.33	14.29	38.18	50.00
Contract Programming	22.22	45.00	27.27	21.88	26.32	24.00	28.57	43.64	55.36
Manufacturer's Personnel	0.00	10.00	0.00	6.25	0.00	5.33	4.76	11.82	12.50
Proprietary Software Packages	22.22	45.00	47.73	48.96	55.26	58.67	47.62	67.27	73.21
Location of Computer (%)									
Distributed Processing Site	11.11	0.00	2.27	2.08	0.00	0.00	0.00	2.75	0.00
Central Processing Installation	88.89	100.00	97.73	97.92	100.00	100.00	100.00	97.25	100.00
Using Local Workstations/Terminals (%)	66.67	85.00	84.09	92.71	97.37	94.67	100.00	97.27	100.00
Using Remote Workstations/Terminals (%)	33.33	65.00	59.09	57.30	55.68	76.00	80.95	89.09	98.21
Using Data Base Management System (%)	33.33	30.00	25.00	40.63	47.37	58.67	42.86	65.45	82.14
None	66.67	70.00	72.73	59.38	52.63	41.33	57.14	32.73	17.86
Manufacturer's Package	100.00	60.00	45.45	60.53	38.89	55.81	33.33	50.00	60.87
Outside Vendor's Package	0.00	40.00	36.36	28.95	61.11	37.21	66.67	41.67	36.96
Home-Grown System	0.00	0.00	18.18	10.53	0.00	6.98	0.00	8.33	2.17
Using Communications Monitor (%)	55.56	85.00	75.00	76.04	97.37	85.33	71.43	90.00	82.14
None	44.44	15.00	20.45	23.96	2.63	14.67	23.81	9.09	16.07
Manufacturer's Package	80.00	64.71	40.63	76.39	72.97	75.00	50.00	80.61	60.00
Outside Vendor's Package	0.00	23.53	53.13	19.44	27.03	23.44	50.00	16.33	31.11
Home-Grown System	20.00	11.76	6.25	4.17	0.00	1.56	0.00	3.06	8.89
Using Integrated Word Processing Functions (%)	0.00	10.00	6.82	2.08	2.63	4.00	14.29	18.18	26.79
Planned Acquisitions/Implementations for 1981 (%)									
Additional Software from the Manufacturer	22.22	35.00	45.45	37.50	60.53	50.67	33.33	55.45	71.43
Proprietary Software from other suppliers	44.44	50.00	38.64	41.67	71.05	57.33	33.33	62.73	73.21
Expansions to Data Communications facilities	33.33	30.00	31.82	36.46	44.74	53.33	47.62	60.91	64.29
Distributed Processing capabilities	11.11	5.00	20.45	9.38	10.53	21.33	19.05	18.18	19.64
Expansions to present hardware	22.22	45.00	52.27	45.83	36.84	58.67	61.90	60.91	66.07
Another Computer System, same model	11.11	5.00	2.27	5.21	2.63	5.33	4.76	6.36	12.50
Integrated Word Processing capabilities	0.00	5.00	6.82	7.29	13.16	16.00	9.52	16.36	12.50
Plans for system replacement in 1981 (%)									
Yes, same manufacturer	33.33	70.00	54.55	40.63	39.47	53.33	38.10	25.45	17.86
Yes, vendor unknown	0.00	5.00	2.27	3.13	2.63	1.33	9.52	3.64	1.79
Yes, different vendor	0.00	0.00	0.00	1.04	2.63	0.00	0.00	0.91	1.79
No	66.67	25.00	38.64	53.13	55.26	44.00	52.38	70.00	76.79

IBM 370/115	IBM 370/125	IBM 370/135	IBM 370/138	IBM 370/145	IBM 370/148	IBM 370/155	IBM 370/158	IBM 370/168	Manufacturer and Model \ Survey Item
									Significant Advantages (%)
11.11	40.00	40.91	46.88	36.84	42.67	33.33	53.64	44.64	Users are happy with response time
33.33	45.00	27.27	29.17	23.68	36.00	19.05	32.73	25.00	System is easy to expand/reconfigure
0.00	15.00	15.91	11.46	10.53	10.67	9.52	10.91	7.14	System costs were less than expected
44.44	55.00	50.00	54.17	44.74	58.67	52.38	53.64	67.86	Programs/data carried over from other systems are compatible, as vendor promised
11.11	45.00	29.55	40.63	28.95	44.00	47.62	52.73	62.50	Terminals/peripherals carried over from other systems are compatible, as vendor promised
11.11	15.00	4.55	6.25	5.26	6.67	0.00	6.36	5.36	System is power/energy efficient
0.00	10.00	11.36	20.83	18.42	21.33	14.29	29.09	25.00	Productivity aids help us keep programming costs down
0.00	5.00	6.82	11.46	10.53	13.33	4.76	22.73	19.64	Data base language is efficient and effective
11.11	10.00	4.55	5.21	10.53	5.33	4.76	4.55	10.71	Delivery and/or installation of equipment was ahead of schedule
11.11	10.00	2.27	3.13	2.63	2.67	0.00	5.45	7.14	Delivery of required software was ahead of schedule
									Significant Problems (%)
22.22	15.00	2.27	5.21	5.26	2.67	0.00	3.64	1.79	Computer proposed by vendor was too small
0.00	10.00	2.27	7.29	2.63	2.67	9.52	5.45	3.57	Installation of equipment was late
0.00	5.00	0.00	5.21	5.26	5.33	4.76	1.82	3.57	Delivery of required software was late
0.00	5.00	13.64	11.46	10.53	17.33	4.76	9.09	16.07	System costs (for hardware, vendor-supplied software, support) exceeded the expected total
22.22	10.00	4.55	11.46	7.89	9.33	4.76	1.82	5.36	Vendor did not provide all the promised software or support
0.00	0.00	2.27	1.04	0.00	2.67	0.00	0.91	0.00	Program/data compatibility not what vendor promised
11.11	0.00	0.00	1.04	0.00	0.00	4.76	1.82	0.00	Terminals/peripherals compatibility not what vendor promised
11.11	30.00	13.64	19.79	15.79	22.67	4.76	15.45	28.57	Vendor enhancements/changes to hardware/software hard to keep up with
0.00	15.00	2.27	2.08	2.63	0.00	0.00	2.73	1.79	Equipment is excessively noisy
11.11	5.00	31.82	14.58	50.00	17.33	23.81	22.73	44.64	Power and/or cooling requirements are excessive
									System Ratings (4.0-0.0)
3.33	2.95	3.05	3.21	3.08	3.25	3.11	3.10	3.00	Ease of operation
3.56	3.50	3.44	3.68	3.21	3.53	2.70	3.40	3.33	Reliability of Mainframe
3.13	3.30	3.21	3.26	3.03	3.20	2.89	3.20	3.17	Reliability of Peripherals
									Maintenance service:
3.22	2.95	2.98	3.23	3.14	3.20	3.05	3.26	3.22	Responsiveness
3.11	2.79	2.95	3.19	2.81	3.15	2.86	3.20	3.16	Effectiveness
									Technical support:
2.89	2.55	2.52	2.91	2.35	2.56	2.70	2.90	2.86	Trouble-shooting
2.78	2.85	2.60	2.86	2.61	2.58	2.90	2.88	2.89	Education
2.44	2.75	2.55	2.74	2.53	2.55	2.90	2.86	2.84	Documentation
									Manufacturer's software:
3.25	2.90	2.95	3.05	2.95	2.99	2.95	3.06	3.14	Operating system
3.56	3.15	3.07	3.18	3.11	3.09	3.10	3.15	3.20	Compilers & Assemblers
3.00	2.71	2.53	2.87	2.85	2.65	2.85	2.81	2.76	Applications Programs
3.33	2.80	2.90	2.97	2.86	2.83	2.86	2.91	2.91	Ease of programming
3.22	2.65	2.76	2.89	2.86	2.82	2.89	2.94	2.89	Ease of conversion
3.33	3.10	2.98	3.09	2.86	3.11	3.05	3.13	3.04	Overall satisfaction
									Did the system do what you expected it to do? (%)
88.89	90.00	93.18	95.83	84.21	92.00	90.48	96.36	96.43	Yes
0.00	0.00	2.27	2.08	5.26	2.67	0.00	0.00	1.79	No
11.11	10.00	2.27	1.04	10.53	5.33	9.52	3.64	1.79	Haven't decided
									Would you recommend system to another user? (%)
66.67	80.00	81.82	85.42	60.53	85.33	61.90	84.55	78.57	Yes
22.22	15.00	18.18	8.33	23.68	8.00	33.33	10.91	12.50	No
11.11	5.00	0.00	5.21	15.79	6.67	4.76	4.55	7.14	Haven't decided

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Three good reasons why professionals pick Apples.

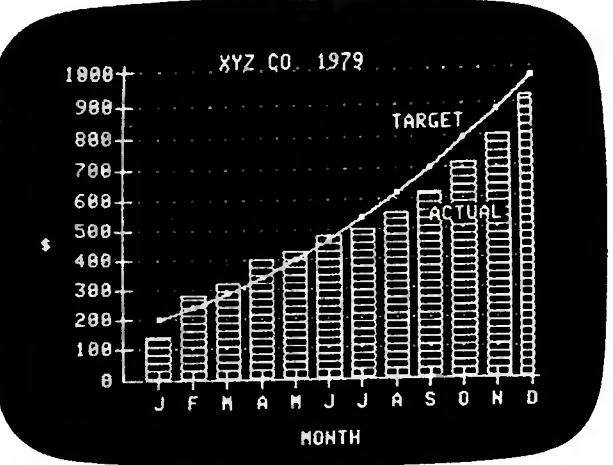
	Apple II	Apple III
Maximum Memory Size	64K bytes	128K bytes
Screen Display	40 column (80 column with peripheral card) 24 Lines Upper Case	80 column 24 Lines Upper Case/Lower Case
Screen Resolution (B&W)	280 x 192	560 x 192
Screen Resolution (Color)	140 x 192 (6 colors)	280 x 192 (16 colors)
Keyboard	Fixed	Programmable
Numeric Key Pad	Accessory	Built-in
Input/Output	8 expansion slots	4 expansion slots plus built-in: disk interface RS-232 interface Silentype™ printer interface
Disk Drives	Add-on one to six drives	One drive built-in, plus interface to support three more drives
Languages	BASIC Fortran 77 Pascal Assembly Pilot	Enhanced BASIC Fortran 77 Pascal Assembly
Typical Configuration Pricing *Suggested retail price.	CPU, 48K RAM, single disk drive, B&W Monitor (9″), Silentype™ printer, and BASIC. $3250.00*	CPU, 96K RAM, integrated disk drive, B&W Monitor (12″), Silentype™ printer, SOS, Enhanced BASIC. $4865.00*

1 In research

Apple personal computer systems help you collect, store and analyze data as fast as you can load a disk and execute a program. Because more than 100 companies offer software for Apple, you have the largest program library for manipulating your data in the personal computing world. Need special programs? Use any of Apple's development languages — BASIC, FORTRAN, Pascal.

2 In engineering

Apple personal computer systems let you define models, make trade-offs and refine prototypes. Want to study cause and effect of several variables? Apple computes new results instantly and displays them in colorful, easy-to-read graphs, charts or plots on a video monitor.



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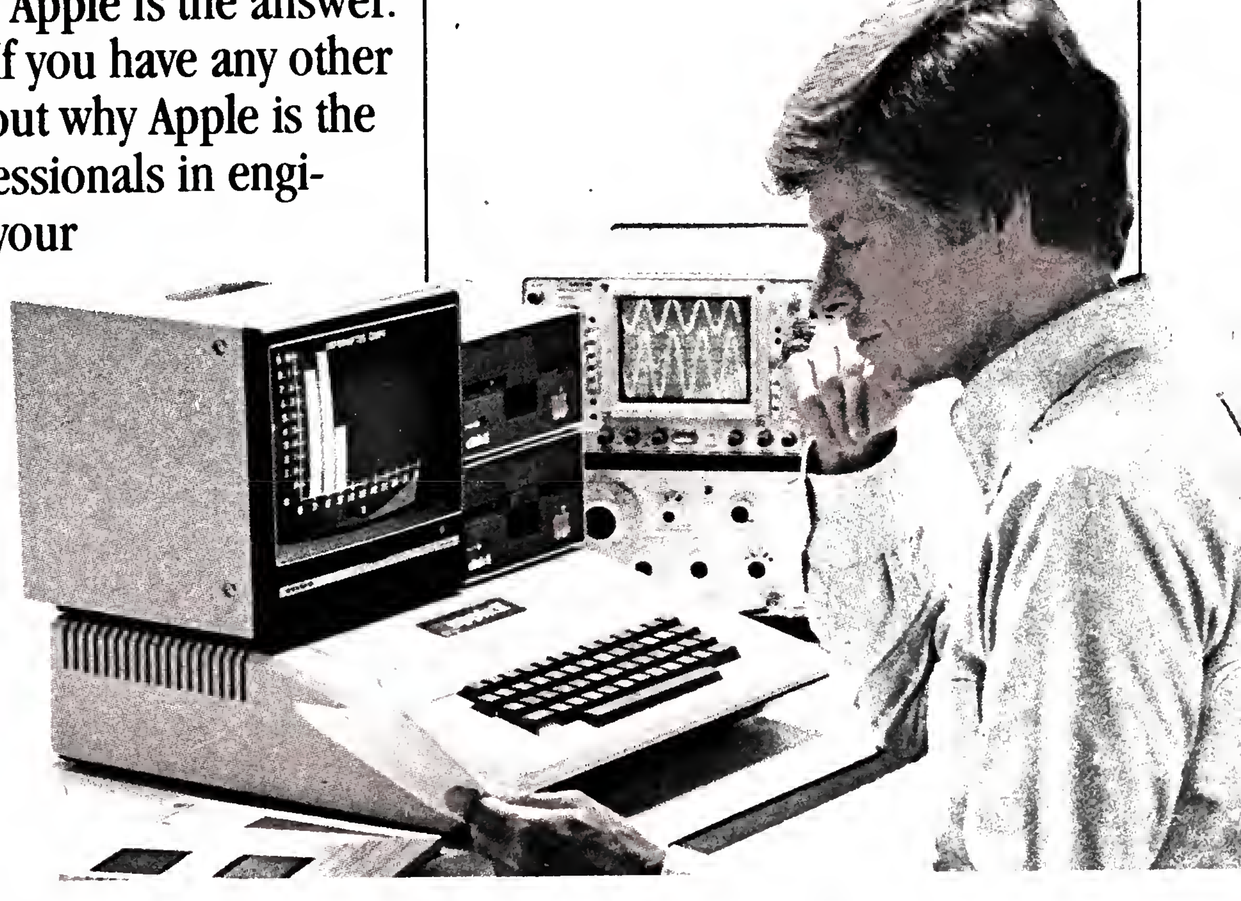

See Apple Computer at NCC,
Booth 626.

Users Rate Their Mainframes . . .

Manufacturer and Model / Survey Item	IBM 370 (other models)	IBM 3031	IBM 3032	IBM 3033	IBM 4331	IBM 4341	Magnuson M80 Series	NAS AS/5	NAS AS/5-7031
No. of User Responses	4	86	30	112	196	123	18	15	4
No. of Systems Represented	5	98	40	174	201	144	24	17	5
Avg. Life of System (Mos.)	2.0	20.4	22.2	14.8	9.0	5.3	11.6	27.7	14.0
Acquisition Method (%)									
Purchase	50.00	37.21	46.67	46.85	22.05	27.05	50.00	60.00	50.00
Rental or Lease from Mfr.	50.00	23.26	20.00	21.62	69.23	59.02	44.44	13.33	0.00
Lease from 3rd Party	0.00	39.53	33.33	31.53	8.72	13.93	5.56	26.67	50.00
Principal Applications (%)									
Accounting/Billing	25.00	75.58	80.00	69.64	75.51	74.80	66.67	73.33	75.00
Banking-check processing/loans/savings	0.00	20.93	30.00	19.64	10.71	11.38	22.22	6.67	0.00
Construction/Architecture	0.00	2.33	3.33	4.46	3.57	2.44	0.00	0.00	0.00
Education-scheduling/administration	25.00	10.47	20.00	7.14	9.69	12.20	16.67	13.33	25.00
Engineering/Scientific	0.00	15.12	23.33	23.21	6.63	13.82	11.11	13.33	0.00
Health care/Medical	25.00	9.30	6.67	7.14	7.14	10.57	5.56	6.67	0.00
Insurance	0.00	12.58	16.67	24.11	9.18	12.20	5.56	20.00	0.00
Manufacturing	0.00	15.12	13.33	20.54	29.59	28.46	11.11	20.00	25.00
Mathematics/Statistics	25.00	18.60	13.33	27.68	9.18	13.01	22.22	20.00	25.00
Order Processing/Inventory Control	25.00	39.53	36.67	45.54	51.53	53.66	38.89	40.00	50.00
Payroll/Personnel	50.00	69.77	60.00	66.96	59.69	64.23	50.00	60.00	75.00
Petroleum/Fuel analysis	0.00	1.16	3.33	4.46	2.55	1.63	0.00	0.00	0.00
Process control	0.00	1.16	13.33	8.93	3.06	2.44	5.56	0.00	0.00
Purchasing	0.00	39.53	23.33	30.36	29.59	39.84	22.22	40.00	25.00
Sales Distribution	0.00	27.91	16.67	26.79	34.69	30.89	22.22	13.33	50.00
Other	25.00	17.44	16.67	21.43	19.39	17.89	16.67	13.33	0.00
Source of Applications Programs (%)									
In-house personnel	100.00	96.51	100.00	95.54	93.88	95.93	94.44	86.67	100.00
"Ready-made" programs from manufacturer	50.00	43.02	46.67	48.21	21.43	38.21	38.89	26.67	50.00
Contract Programming	0.00	50.00	43.33	53.57	20.92	35.77	44.44	53.33	50.00
Manufacturer's Personnel	0.00	4.65	10.00	10.71	1.53	4.07	5.56	0.00	0.00
Proprietary Software Packages	25.00	67.44	66.67	63.39	40.82	61.79	66.67	53.33	75.00
Location of Computer (%)									
Distributed Processing Site	0.00	0.00	0.00	1.79	6.63	2.44	0.00	0.00	0.00
Central Processing Installation	100.00	100.00	100.00	98.21	93.37	97.56	100.00	100.00	100.00
Using Local Workstations/Terminals (%)	75.00	98.83	96.67	100.00	96.43	98.38	94.44	93.33	100.00
Using Remote Workstations/Terminals (%)	100.00	93.02	93.33	91.96	51.52	75.61	55.56	80.00	100.00
Using Data Base Management System (%)	75.00	53.49	76.67	83.04	32.65	43.90	38.89	66.67	50.00
None	25.00	46.51	23.33	16.96	67.35	55.28	61.11	33.33	50.00
Manufacturer's Package	66.67	57.78	60.87	74.19	68.25	61.11	14.29	0.00	0.00
Outside Vendor's Package	33.33	40.00	34.78	23.66	30.16	35.19	85.71	70.00	100.00
Home-Grown System	0.00	2.22	4.35	2.15	1.59	3.70	0.00	30.00	0.00
Using Communications Monitor (%)	25.00	89.53	83.33	85.71	74.49	86.99	72.22	100.00	50.00
None	75.00	8.14	16.67	12.50	22.96	12.20	27.78	0.00	50.00
Manufacturer's Package	100.00	92.11	75.00	75.53	83.45	80.77	38.46	20.00	50.00
Outside Vendor's Package	0.00	7.89	16.67	22.34	12.41	16.35	53.85	66.67	50.00
Home-Grown System	0.00	0.00	8.33	2.13	4.14	2.88	7.69	13.33	0.00
Using Integrated Word Processing Functions (%)	50.00	12.79	10.00	30.36	3.57	12.20	11.11	26.67	25.00
Planned Acquisitions/Implementations for 1981 (%)									
Additional Software from the Manufacturer	25.00	73.26	70.00	66.07	45.92	62.60	38.89	26.67	0.00
Proprietary Software from other suppliers	25.00	63.95	63.33	68.75	49.49	63.41	72.22	80.00	75.00
Expansions to Data Communications facilities	25.00	66.28	63.33	74.11	41.33	61.79	72.22	80.00	25.00
Distributed Processing capabilities	25.00	29.07	6.67	39.29	14.80	18.70	11.11	26.67	25.00
Expansions to present hardware	50.00	66.28	73.33	65.18	42.86	49.59	50.00	66.67	25.00
Another Computer System, same model	0.00	6.98	16.67	18.75	2.04	16.26	11.11	0.00	0.00
Integrated Word Processing capabilities	25.00	13.95	20.00	22.32	6.63	19.51	5.56	6.67	0.00
Plans for system replacement in 1981 (%)									
Yes, same manufacturer	0.00	20.93	16.67	7.14	9.18	3.25	5.56	0.00	0.00
Yes, vendor unknown	0.00	1.16	0.00	3.57	1.53	0.81	0.00	0.00	0.00
Yes, different vendor	0.00	1.16	3.33	0.00	0.00	0.00	0.00	26.67	0.00
No	100.00	76.74	80.00	89.29	88.78	95.93	94.44	73.33	100.00

IBM 370 (other models)	IBM 3031	IBM 3032	IBM 3033	IBM 4331	IBM 4341	Magnuson M80 Series	NAS AS/5	NAS AS/5-7031	Manufacturer and Model / Survey Item
									Significant Advantages (%)
50.00	54.65	46.67	57.14	51.02	69.11	44.44	53.33	50.00	Users are happy with response time
25.00	46.51	26.67	48.21	48.98	66.67	94.44	33.33	0.00	System is easy to expand/reconfigure
0.00	10.47	23.33	11.61	21.94	13.82	55.56	33.33	25.00	System costs were less than expected
50.00	62.79	53.33	72.32	55.10	72.36	88.89	66.67	100.00	Programs/data carried over from other systems are compatible, as vendor promised
50.00	54.65	60.00	71.43	30.10	65.85	83.33	73.33	75.00	Terminals/peripherals carried over from other systems are compatible, as vendor promised
50.00	16.28	10.00	23.21	65.82	69.92	88.89	66.67	25.00	System is power/energy efficient
25.00	26.74	20.00	26.79	44.90	29.27	22.22	13.33	0.00	Productivity aids help us keep programming costs down
50.00	10.47	16.67	18.75	8.67	8.13	5.56	20.00	0.00	Data base language is efficient and effective
0.00	16.28	16.67	22.32	23.98	23.58	55.56	46.67	25.00	Delivery and/or installation of equipment was ahead of schedule
0.00	3.49	10.00	12.50	11.22	6.50	5.56	6.67	0.00	Delivery of required software was ahead of schedule
									Significant Problems (%)
0.00	3.49	3.33	2.68	6.63	3.25	0.00	0.00	0.00	Computer proposed by vendor was too small
0.00	6.98	3.33	3.57	12.24	15.45	0.00	0.00	0.00	Installation of equipment was late
0.00	3.49	3.33	2.68	14.80	15.45	5.56	0.00	0.00	Delivery of required software was late
0.00	13.95	10.00	7.14	17.35	5.69	5.56	0.00	0.00	System costs (for hardware, vendor-supplied software, support) exceeded the expected total
50.00	8.14	10.00	2.68	18.88	17.89	0.00	6.67	0.00	Vendor did not provide all the promised software or support
0.00	1.16	3.33	0.00	5.61	5.69	0.00	0.00	0.00	Program/data compatibility not what vendor promised
25.00	1.16	3.33	0.89	1.02	0.81	0.00	0.00	0.00	Terminals/peripherals compatibility not what vendor promised
25.00	23.26	26.67	18.75	29.08	18.70	0.00	13.33	0.00	Vendor enhancements/changes to hardware/software hard to keep up with
0.00	1.16	3.33	0.00	0.51	0.00	0.00	0.00	0.00	Equipment is excessively noisy
25.00	9.30	20.00	16.07	0.00	0.00	0.00	6.67	0.00	Power and/or cooling requirements are excessive
									System Ratings (4.0-0.0)
3.50	3.18	3.10	3.29	3.30	3.35	3.72	3.73	3.50	Ease of operation
3.25	3.47	3.33	3.55	3.76	3.66	3.89	3.07	3.50	Reliability of Mainframe
2.75	3.29	3.10	3.24	3.39	3.17	3.19	3.07	3.00	Reliability of Peripherals
									Maintenance service:
3.75	3.28	3.14	3.31	3.29	3.22	3.47	3.27	3.50	Responsiveness
3.33	3.18	3.03	3.26	3.28	3.13	3.35	2.87	3.50	Effectiveness
									Technical support:
3.00	2.81	2.86	3.11	2.79	2.72	3.31	2.85	3.00	Trouble-shooting
3.00	2.82	2.96	2.96	2.73	2.71	2.94	2.67	2.00	Education
3.50	2.72	2.86	2.87	2.66	2.66	3.00	2.50	2.50	Documentation
									Manufacturer's software:
3.25	3.13	3.17	3.26	2.99	2.84	3.23	3.09	3.50	Operating system
3.25	3.27	3.10	3.24	3.21	3.13	3.08	3.00	3.50	Compilers & Assemblers
3.25	2.85	2.80	2.98	2.86	2.72	2.88	2.90	3.00	Applications Programs
3.25	3.00	2.93	3.02	3.05	2.93	3.25	3.23	3.00	Ease of programming
3.00	3.05	2.89	3.13	2.90	2.88	3.59	3.31	3.25	Ease of conversion
3.25	3.11	3.00	3.21	3.09	3.16	3.61	3.14	3.50	Overall satisfaction
									Did the system do what you expected it to do? (%)
100.00	91.86	96.67	97.32	82.65	91.06	88.89	93.33	100.00	Yes
0.00	1.16	0.00	0.00	5.10	0.81	0.00	6.67	0.00	No
0.00	6.98	3.33	2.68	12.24	8.13	11.11	0.00	0.00	Haven't decided
									Would you recommend system to another user? (%)
100.00	86.05	66.67	92.86	85.71	91.06	94.44	86.67	100.00	Yes
0.00	3.49	33.33	1.79	4.59	2.44	0.00	6.67	0.00	No
0.00	9.30	0.00	5.36	9.69	6.50	5.56	6.67	0.00	Haven't decided

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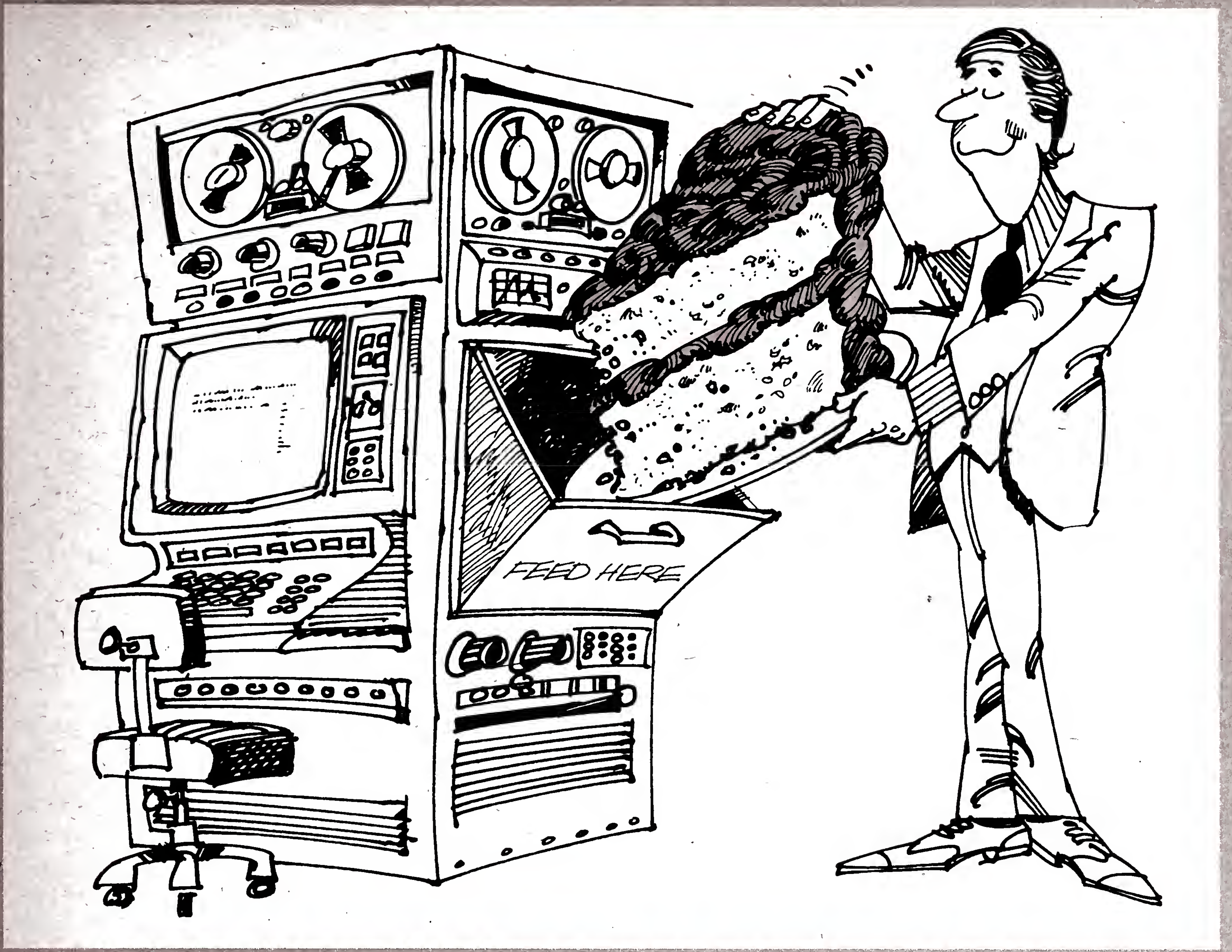

UFO makes CICS application programming a…

"piece of cake."

listen to the people who use it:

Greg O'Reilly, Systems Manager, Figi's, Marshfield, WI "We have gotten many applications going because UFO is so easy to use… jobs such as on-line credit card verification, file maintenance utilities created without CICS mapping, and many small requests by user departments. Most of our people aren't CICS trained."

Steve Harris, Director of MIS, Children's Hospital, Boston, MA "The first thing I did when I joined the hospital was buy UFO because I used it for more than a year at my last job; we are simply more productive in our on-line development with UFO. Many projects which were too expensive with traditional CICS technology become cost-effective when you use UFO.

"UFO trades off machine power for people power. While it takes a reasonable amount of training to teach someone UFO, you certainly don't have to be a CICS programmer to use it."

Ken Cyrus, Database Manager, Carter Machinery, Salem, VA "We were looking to get on-line transactions up faster than under standard COBOL. We had DMS installed for two weeks, but got absolutely nothing done. Within the first two weeks with UFO, we had at least 20 to 30 VSAM update/inquiry programs up.

The most surprising thing about UFO was its execution speed. I never figured anything interpretive could execute as fast as it does."

Frank Scafidi, Director of Technical Services, University of Pennsylvania, Philadelphia, PA "Two years ago we had 10 applications up under CICS. Today, we have over 50 applications up under UFO. We never could have done so much without UFO."

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Users Rate Their Mainframes . . .

Manufacturer and Model / Survey Item	NAS AS/6	NAS AS/5000	NAS AS/7000	NCR Century 101-200	NCR 8400 Series	NCR 8500 Series	Univac 90/30	Univac 90/40	Univac 90/60
No. of User Responses	6	4	5	25	60	62	52	15	7
No. of Systems Represented	7	5	5	25	60	75	53	17	7
Avg. Life of System (Mos.)	27.5	11.5	11.0	80.7	12.3	25.6	42.1	22.6	45.7
Acquisition Method (%)									
Purchase	50.00	50.00	20.00	56.00	26.67	30.65	32.69	13.33	57.14
Rental or Lease from Mfr	16.67	25.00	0.00	16.00	51.67	48.39	57.69	86.67	28.57
Lease from 3rd Party	33.33	25.00	80.00	28.00	21.67	20.97	9.62	0.00	14.29
Principal Applications (%)									
Accounting/Billing	66.67	50.00	60.00	88.00	75.00	62.90	88.46	73.33	85.71
Banking check processing/loans/savings	33.33	25.00	0.00	0.00	23.33	32.26	3.85	6.67	14.29
Construction/Architecture	0.00	0.00	0.00	0.00	3.33	1.61	0.00	0.00	0.00
Education-scheduling/administration	0.00	25.00	20.00	16.00	6.67	1.61	15.38	20.00	0.00
Engineering/Scientific	16.67	0.00	20.00	0.00	5.00	3.23	5.77	0.00	14.29
Health care/Medical	16.67	25.00	0.00	8.00	13.33	4.84	9.62	26.67	0.00
Insurance	33.33	50.00	20.00	8.00	1.67	3.23	9.62	20.00	0.00
Manufacturing	33.33	0.00	20.00	20.00	25.00	19.35	25.00	20.00	28.57
Mathematics/Statistics	33.33	0.00	0.00	0.00	3.33	3.23	7.69	6.67	0.00
Order Processing/Inventory Control	33.33	25.00	60.00	36.00	35.00	50.00	57.69	53.33	57.14
Payroll/Personnel	50.00	25.00	60.00	60.00	63.33	62.90	67.31	60.00	85.71
Petroleum/Fuel analysis	0.00	0.00	0.00	4.00	1.67	1.61	3.85	6.67	14.29
Process control	0.00	0.00	0.00	4.00	1.67	1.61	1.92	6.67	0.00
Purchasing	16.67	0.00	40.00	8.00	25.00	19.35	28.85	26.67	57.14
Sales Distribution	0.00	0.00	20.00	24.00	23.33	40.32	46.15	46.67	28.57
Other	16.67	25.00	20.00	16.00	15.00	14.52	25.00	20.00	28.57
Source of Applications Programs (%)									
In-house personnel	100.00	100.00	100.00	84.00	80.00	85.48	98.08	100.00	100.00
"Ready-made" programs from manufacturer	66.67	25.00	0.00	60.00	73.33	53.23	21.15	46.67	14.29
Contract Programming	66.67	75.00	80.00	12.00	36.67	20.97	19.23	33.33	14.29
Manufacturer's Personnel	16.67	0.00	0.00	12.00	8.33	9.68	13.46	13.33	0.00
Proprietary Software Packages	66.67	25.00	80.00	24.00	25.00	37.10	21.15	40.00	0.00
Location of Computer (%)									
Distributed Processing Site	0.00	25.00	0.00	0.00	0.00	3.23	1.92	0.00	0.00
Central Processing Installation	100.00	75.00	100.00	100.00	100.00	96.77	98.08	100.00	100.00
Using Local Workstations/Terminals (%)	100.00	100.00	100.00	96.00	100.00	100.00	98.08	100.00	100.00
Using Remote Workstations/Terminals (%)	83.33	100.00	100.00	96.00	100.00	100.00	94.23	93.33	71.43
Using Data-Base Management System (%)	83.33	25.00	80.00	0.00	21.67	32.26	19.23	20.00	42.86
None	16.67	75.00	20.00	100.00	78.33	67.74	80.77	80.00	57.14
Manufacturer's Package	0.00	0.00	50.00	0.00	46.15	15.00	90.00	100.00	66.67
Outside Vendor's Package	100.00	100.00	50.00	0.00	23.08	70.00	0.00	0.00	33.33
Home-Grown System	0.00	0.00	0.00	0.00	30.77	15.00	10.00	0.00	0.00
Using Communications Monitor (%)	100.00	100.00	80.00	12.00	36.67	64.52	51.92	80.00	57.14
None	0.00	0.00	20.00	88.00	60.00	35.48	44.23	20.00	42.86
Manufacturer's Package	16.67	50.00	0.00	66.67	72.73	50.00	96.30	100.00	75.00
Outside Vendor's Package	83.33	25.00	100.00	33.33	27.27	32.50	0.00	0.00	0.00
Home-Grown System	0.00	25.00	0.00	0.00	0.00	17.50	3.70	0.00	25.00
Using Integrated Word Processing Functions (%)	16.67	50.00	20.00	0.00	3.33	3.23	0.00	6.67	14.29
Planned Acquisitions/Implementations for 1981 (%)									
Additional Software from the Manufacturer	0.00	50.00	20.00	16.00	41.67	40.32	28.85	40.00	0.00
Proprietary Software from other suppliers	50.00	50.00	80.00	8.00	31.67	38.71	13.46	53.33	14.29
Expansions to Data Communications facilities	66.67	75.00	40.00	8.00	41.67	48.39	55.77	46.67	57.14
Distributed Processing capabilities	33.33	25.00	20.00	4.00	10.00	11.29	13.46	13.33	0.00
Expansions to present hardware	50.00	75.00	40.00	4.00	38.33	54.84	46.15	60.00	28.57
Another Computer System, same model	16.67	0.00	20.00	4.00	0.00	4.84	11.54	13.33	0.00
Integrated Word Processing capabilities	0.00	0.00	20.00	4.00	18.33	6.45	3.85	6.67	0.00
Plans for system replacement in 1981 (%)									
Yes, same manufacturer	0.00	0.00	0.00	12.00	3.33	4.84	13.46	6.67	0.00
Yes, vendor unknown	16.67	0.00	0.00	12.00	1.67	0.00	5.77	6.67	0.00
Yes, different vendor	0.00	25.00	0.00	28.00	3.33	3.23	0.00	13.33	0.00
No	83.33	75.00	100.00	48.00	91.67	90.32	80.77	73.33	100.00

NAS AS/6	NAS AS/5000	NAS AS/7000	NCR Century 101-2C	NCR 8400 Series	NCR 8500 Series	Univac 90/30	Univac 90/40	Univac 90/60	Manufacturer and Model / Survey Item
									Significant Advantages (%)
50.00	50.00	100.00	36.00	56.67	59.68	42.31	60.00	71.43	Users are happy with response time
33.33	50.00	80.00	32.00	81.67	74.19	63.46	60.00	57.14	System is easy to expand/reconfigure
16.67	25.00	40.00	8.00	21.67	22.58	21.15	13.33	14.29	System costs were less than expected
66.67	100.00	80.00	36.00	75.00	62.90	46.15	60.00	85.71	Programs/data carried over from other systems are compatible, as vendor promised
83.33	75.00	80.00	12.00	40.00	45.16	13.46	26.67	14.29	Terminals/peripherals carried over from other systems are compatible, as vendor promised
50.00	75.00	60.00	4.00	21.67	25.81	7.69	6.67	14.29	System is power/energy efficient
33.33	25.00	20.00	4.00	25.00	32.26	34.62	33.33	71.43	Productivity aids help us keep programming costs down
0.00	25.00	0.00	0.00	5.00	11.29	1.92	0.00	14.29	Data base language is efficient and effective
16.67	0.00	40.00	0.00	13.33	20.97	28.85	13.33	28.57	Delivery and/or installation of equipment was ahead of schedule
0.00	0.00	20.00	0.00	13.33	6.45	17.31	6.67	14.29	Delivery of required software was ahead of schedule
									Significant Problems (%)
0.00	0.00	0.00	8.00	3.33	8.06	21.15	20.00	28.57	Computer proposed by vendor was too small
0.00	25.00	20.00	0.00	35.00	11.29	3.85	13.33	14.29	Installation of equipment was late
0.00	0.00	0.00	0.00	15.00	20.97	1.92	20.00	0.00	Delivery of required software was late
0.00	0.00	0.00	16.00	20.00	11.29	15.38	13.33	0.00	System costs (for hardware, vendor-supplied software, support) exceeded the expected total
0.00	25.00	0.00	12.00	20.00	30.65	19.23	26.67	0.00	Vendor did not provide all the promised software or support
0.00	0.00	0.00	0.00	6.67	4.84	192	13.33	0.00	Program/data compatibility not what vendor promised
0.00	0.00	0.00	0.00	5.00	1.61	1.92	13.33	0.00	Terminals/peripherals compatibility not what vendor promised
0.00	0.00	0.00	16.00	11.67	16.13	17.31	33.33	14.29	Vendor enhancements/changes to hardware/software hard to keep up with
0.00	25.00	0.00	28.00	1.67	3.23	5.77	0.00	0.00	Equipment is excessively noisy
0.00	0.00	0.00	20.00	6.67	3.23	5.77	0.00	14.29	Power and/or cooling requirements are excessive
									System Ratings (4.0-0.0)
3.50	3.75	3.80	2.92	3.41	3.38	3.24	3.20	3.00	Ease of operation
3.83	3.25	4.00	3.28	3.48	3.55	3.46	3.33	3.14	Reliability of Mainframe
2.33	2.75	3.25	2.84	3.10	3.10	3.02	2.73	3.00	Reliability of Peripherals
									Maintenance service:
3.00	3.25	3.60	2.96	3.13	3.06	3.31	2.93	3.14	Responsiveness
3.00	3.00	3.40	2.80	3.05	2.86	3.18	2.80	2.71	Effectiveness
									Technical support:
2.50	3.25	3.60	2.36	2.54	2.39	2.65	2.40	3.00	Trouble-shooting
1.83	2.50	2.80	2.48	2.56	2.65	2.37	2.40	2.29	Education
2.00	2.50	2.80	2.39	2.36	2.47	2.37	2.27	2.57	Documentation
									Manufacturer's software:
3.25	3.33	3.00	3.00	3.05	3.10	3.08	3.07	3.57	Operating system
3.50	3.33	3.00	3.04	3.05	3.00	3.20	3.20	3.14	Compilers & Assemblers
2.33	3.00	3.00	2.74	2.68	2.56	2.77	2.67	2.50	Applications Programs
2.67	3.25	3.25	2.83	3.12	3.00	3.14	3.07	3.00	Ease of programming
3.00	3.50	3.25	2.95	3.33	3.13	2.94	2.60	3.00	Ease of conversion
3.25	3.50	3.60	2.88	3.12	3.03	3.04	2.80	2.86	Overall satisfaction
									Did the system do what you expected it to do? (%)
83.33	100.00	100.00	88.00	80.00	91.94	75.00	73.33	85.71	Yes
0.00	0.00	0.00	8.00	8.33	6.45	11.54	13.33	0.00	No
16.67	0.00	0.00	4.00	11.67	1.61	13.46	13.33	14.29	Haven't decided
									Would you recommend system to another user? (%)
83.33	100.00	100.00	40.00	83.33	79.03	69.23	60.00	42.86	Yes
16.67	0.00	0.00	48.00	5.00	11.29	11.54	20.00	42.86	No
0.00	0.00	0.00	12.00	10.00	9.68	19.23	20.00	14.29	Haven't decided

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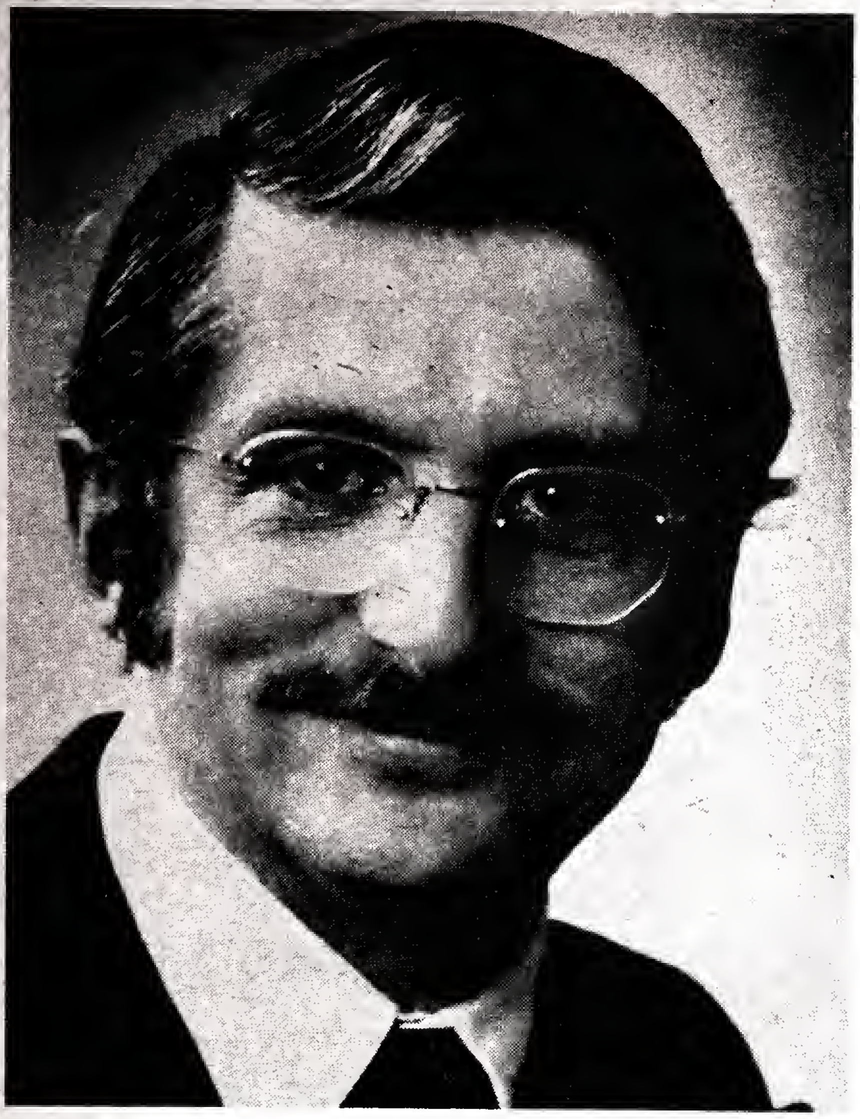

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Users Rate Their Mainframes . . .

Manufacturer and Model Survey Item	Univac 90/70	Univac 90/80	Univac 1100/10	Univac 1100/40	Univac 1100/60	Univac 1100/80	Univac 1106/1108	Univac (other models)	Mainframes (other models)
No. of User Responses	4	11	10	5	5	15	6	5	3
No. of Systems Represented	6	12	10	6	5	16	8	5	3
Avg. Life of System (Mos.)	39.0	15.5	33.6	41.5	7.8	15.9	73.2	60.00	29.0
Acquisition Method (%)									
Purchase	50.00	27.27	20.00	20.00	20.00	13.33	50.00	40.00	33.33
Rental or Lease from Mfr.	25.00	63.64	70.00	80.00	80.00	80.00	33.33	60.00	33.33
Lease from 3rd Party	25.00	9.09	10.00	0.00	0.00	6.67	16.67	0.00	33.33
Principal Applications (%)									
Accounting/Billing	50.00	81.82	90.00	80.00	80.00	66.67	50.00	60.00	33.33
Banking-check processing/loans/savings	25.00	0.00	10.00	20.00	0.00	6.67	0.00	0.00	0.00
Construction/Architecture	0.00	9.09	10.00	0.00	20.00	6.67	0.00	0.00	0.00
Education-scheduling/administration	25.00	27.27	10.00	20.00	20.00	46.67	0.00	0.00	0.00
Engineering/Scientific	25.00	36.36	10.00	60.00	0.00	13.33	33.33	0.00	0.00
Health care/Medical	0.00	9.09	20.00	0.00	20.00	13.33	0.00	0.00	0.00
Insurance	0.00	18.18	20.00	0.00	0.00	13.33	16.67	20.00	33.33
Manufacturing	25.00	9.09	30.00	40.00	0.00	0.00	16.67	20.00	33.33
Mathematics/Statistics	50.00	45.45	10.00	40.00	0.00	46.67	16.67	0.00	0.00
Order Processing/Inventory Control	25.00	27.27	70.00	60.00	80.00	46.67	33.33	20.00	66.67
Payroll/Personnel	25.00	81.82	90.00	100.00	80.00	46.67	66.67	40.00	33.33
Petroleum/Fuel analysis	0.00	9.09	20.00	0.00	0.00	0.00	0.00	20.00	0.00
Process control	0.00	0.00	10.00	40.00	20.00	6.67	0.00	0.00	0.00
Purchasing	0.00	27.27	60.00	0.00	60.00	46.67	16.67	0.00	0.00
Sales Distribution	25.00	27.27	60.00	20.00	40.00	20.00	33.33	0.00	33.33
Other	25.00	54.55	30.00	20.00	40.00	33.33	83.33	40.00	0.00
Source of Applications Programs (%)									
In-house personnel	100.00	100.00	100.00	100.00	100.00	100.00	83.33	100.00	66.67
"Ready-made" programs from manufacturer	25.00	36.36	40.00	40.00	60.00	33.33	66.67	0.00	33.33
Contract Programming	0.00	27.27	30.00	40.00	40.00	46.67	50.00	0.00	33.33
Manufacturer's Personnel	0.00	18.18	50.00	20.00	40.00	20.00	33.33	0.00	0.00
Proprietary Software Packages	25.00	36.36	20.00	40.00	40.00	40.00	50.00	0.00	33.33
Location of Computer (%)									
Distributed Processing Site	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00
Central Processing Installation	100.00	100.00	100.00	100.00	100.00	100.00	100.00	80.00	100.00
Using Local Workstations/Terminals (%)	100.00	100.00	100.00	80.00	100.00	100.00	100.00	100.00	66.67
Using Remote Workstations/Terminals (%)	100.00	100.00	100.00	100.00	80.00	100.00	100.00	80.00	33.33
Using Data Base Management System (%)	25.00	36.36	90.00	100.00	60.00	100.00	50.00	0.00	0.00
None	75.00	63.64	10.00	0.00	40.00	0.00	50.00	100.00	0.00
Manufacturer's Package	0.00	75.00	100.00	100.00	100.00	80.00	66.67	100.00	0.00
Outside Vendor's Package	0.00	25.00	0.00	0.00	0.00	6.67	33.33	0.00	0.00
Home-Grown System	100.00	0.00	0.00	0.00	0.00	13.33	0.00	0.00	0.00
Using Communications Monitor (%)	50.00	63.64	80.00	60.00	60.00	66.67	66.67	20.00	33.33
None	50.00	36.36	20.00	40.00	40.00	26.67	33.33	80.00	66.67
Manufacturer's Package	100.00	100.00	100.00	100.00	100.00	60.00	100.00	100.00	100.00
Outside Vendor's Package	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
Home-Grown System	0.00	0.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00
Using Integrated Word Processing Functions (%)	25.00	27.27	10.00	20.00	20.00	20.00	33.33	0.00	0.00
Planned Acquisitions/Implementations for 1981 (%)									
Additional Software from the Manufacturer	0.00	18.18	40.00	20.00	80.00	40.00	16.67	20.00	66.67
Proprietary Software from other suppliers	25.00	27.27	20.00	0.00	20.00	33.33	33.33	0.00	66.67
Expansions to Data Communications facilities	25.00	45.45	70.00	80.00	60.00	73.33	83.33	0.00	33.33
Distributed Processing capabilities	0.00	0.00	20.00	20.00	40.00	20.00	0.00	0.00	66.67
Expansions to present hardware	25.00	54.55	70.00	60.00	80.00	40.00	50.00	20.00	33.33
Another Computer System, same model	0.00	0.00	20.00	0.00	0.00	26.67	16.67	20.00	0.00
Integrated Word Processing capabilities	0.00	9.09	10.00	0.00	40.00	6.67	16.67	0.00	0.00
Plans for system replacement in 1981 (%)									
Yes, same manufacturer	25.00	0.00	30.00	20.00	0.00	0.00	50.00	20.00	33.33
Yes, vendor unknown	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yes, different vendor	25.00	0.00	10.00	0.00	0.00	0.00	16.67	0.00	0.00
No	25.00	100.00	60.00	80.00	100.00	100.00	33.33	80.00	66.67

Univac 90/70	Univac 90/80	Univac 1100/10	Univac 1100/40	Univac 1100/60	Univac 1100/80	Univac 1106/1108	Univac (other models)	Mainframes (other models)	Manufacturer and Model Survey Item
									Significant Advantages (%)
25.00	63.64	90.00	40.00	40.00	73.33	0.00	60.00	66.67	Users are happy with response time
0.00	72.73	90.00	40.00	40.00	80.00	33.33	60.00	66.67	System is easy to expand/reconfigure
0.00	18.18	10.00	0.00	20.00	13.33	0.00	40.00	66.67	System costs were less than expected
0.00	54.55	10.00	20.00	20.00	66.67	0.00	40.00	100.00	Programs/data carried over from other systems are compatible, as vendor promised
0.00	27.27	10.00	20.00	20.00	60.00	0.00	20.00	66.67	Terminals/peripherals carried over from other systems are compatible, as vendor promised
0.00	27.27	0.00	0.00	40.00	40.00	0.00	60.00	33.33	System is power/energy efficient
25.00	63.64	70.00	20.00	20.00	6.67	16.67	20.00	0.00	Productivity aids help us keep programming costs down
0.00	0.00	90.00	60.00	40.00	40.00	16.67	0.00	0.00	Data base language is efficient and effective
0.00	18.18	10.00	20.00	40.00	46.67	16.67	40.00	33.33	Delivery and/or installation of equipment was ahead of schedule
0.00	0.00	10.00	0.00	20.00	20.00	16.67	20.00	0.00	Delivery of required software was ahead of schedule
									Significant Problems (%)
0.00	0.00	50.00	40.00	0.00	6.67	0.00	0.00	33.33	Computer proposed by vendor was too small
25.00	0.00	10.00	0.00	20.00	0.00	0.00	0.00	0.00	Installation of equipment was late
25.00	9.09	10.00	0.00	20.00	6.67	16.67	0.00	0.00	Delivery of required software was late
50.00	0.00	30.00	20.00	20.00	6.67	0.00	0.00	33.33	System costs (for hardware, vendor-supplied software, support) exceeded the expected total
50.00	9.09	30.00	20.00	40.00	0.00	0.00	0.00	0.00	Vendor did not provide all the promised software or support
25.00	9.09	0.00	0.00	20.00	6.67	0.00	0.00	0.00	Program/data compatibility not what vendor promised
25.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	Terminals/peripherals compatibility not what vendor promised
25.00	18.18	20.00	40.00	0.00	6.67	0.00	20.00	0.00	Vendor enhancements/changes to hardware/software hard to keep up with
25.00	0.00	0.00	0.00	20.00	0.00	16.67	40.00	0.00	Equipment is excessively noisy
25.00	9.09	0.00	0.00	0.00	6.67	50.00	20.00	0.00	Power and/or cooling requirements are excessive
									System Ratings (4.0-0.0)
3.25	3.45	3.60	3.00	3.60	3.29	3.40	3.20	3.67	Ease of operation
2.75	3.64	3.60	2.80	3.40	3.60	3.00	3.60	3.33	Reliability of Mainframe
2.50	2.82	2.90	2.40	3.20	2.87	2.80	3.40	3.00	Reliability of Peripherals
									Maintenance service:
3.00	3.36	3.30	3.00	3.60	3.57	3.40	3.40	3.67	Responsiveness
2.50	2.91	3.10	3.00	3.40	3.21	3.20	3.40	3.00	Effectiveness
									Technical support:
1.75	3.00	2.30	2.00	3.00	2.79	2.75	3.40	3.50	Trouble-shooting
2.75	2.73	2.60	2.60	2.40	2.80	2.67	3.00	3.33	Education
2.50	2.73	2.40	2.40	1.80	2.73	2.83	3.00	3.00	Documentation
									Manufacturer's software:
3.25	3.45	3.70	2.20	3.60	3.33	3.50	3.75	3.00	Operating system
2.25	3.36	3.60	2.60	3.60	3.00	3.00	3.50	3.50	Compilers & Assemblers
2.25	2.70	2.78	2.25	2.33	2.70	2.25	3.40	3.00	Applications Programs
2.75	3.45	3.30	3.00	3.25	3.27	3.17	3.40	3.00	Ease of programming
2.75	3.18	2.80	2.25	2.20	3.31	2.50	3.75	3.00	Ease of conversion
2.50	3.18	3.20	2.60	3.40	3.20	2.60	3.40	3.00	Overall satisfaction
									Did the system do what you expected it to do? (%)
75.00	81.82	100.00	8000	60.00	86.67	100.00	100.00	100.00	Yes
25.00	0.00	0.00	20.00	20.00	0.00	0.00	0.00	0.00	No
0.00	18.18	0.00	0.00	20.00	13.33	0.00	0.00	0.00	Haven't decided
									Would you recommend system to another user? (%)
25.00	72.73	100.00	40.00	80.00	93.33	66.67	60.00	100.00	Yes
75.00	18.18	0.00	20.00	20.00	0.00	33.33	20.00	0.00	No
0.00	9.09	0.00	40.00	0.00	6.67	0.00	0.00	0.00	Haven't decided

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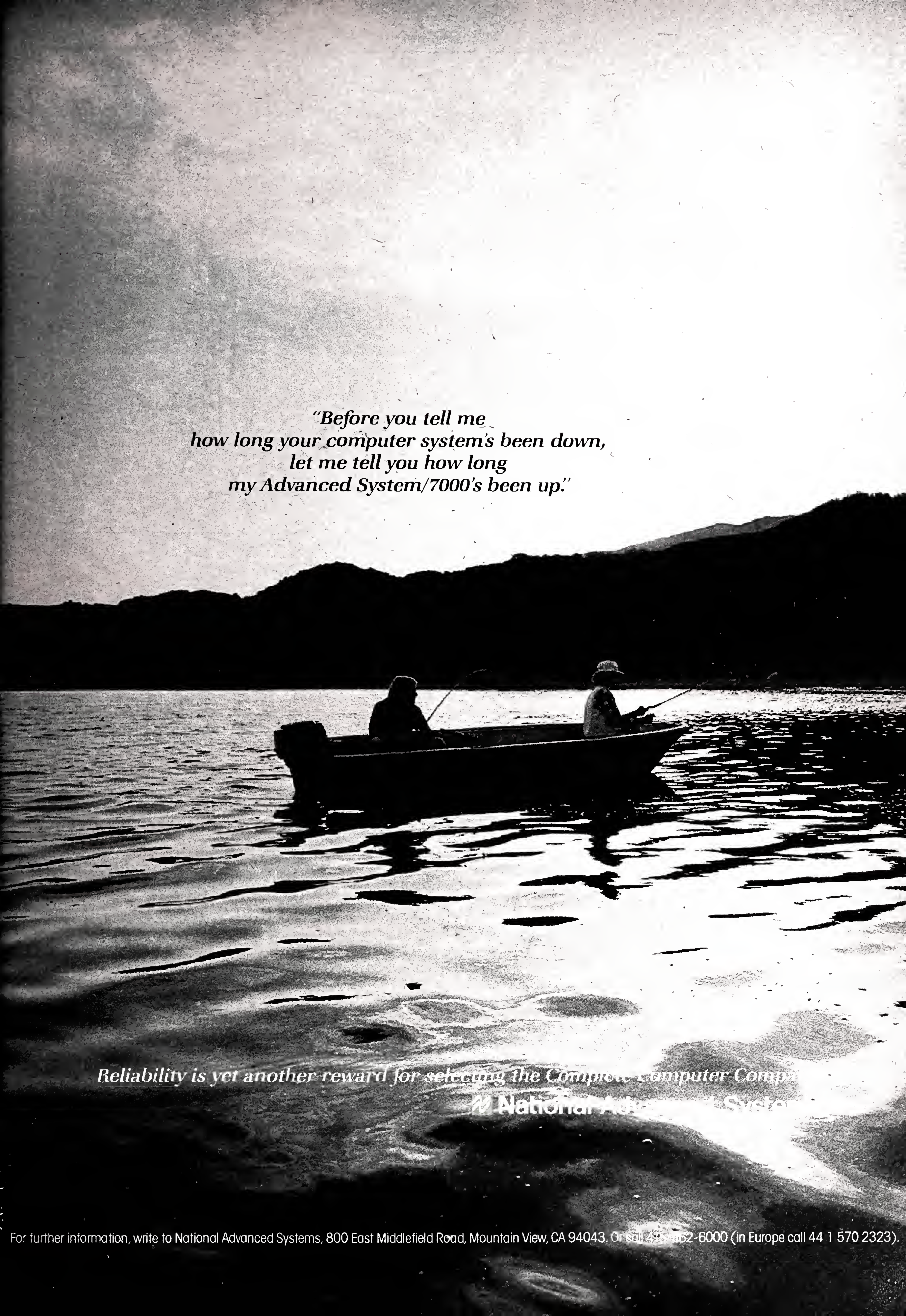
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EDITORIAL

Not Just National Anymore

The National Computer Conference is getting less national all the time, considering the many nations represented by attendees, exhibitors and speakers at the world's largest annual gathering of computing specialists.

The show demonstrates how much the technology has spread to other countries and how manufacturers and researchers in other countries have come to exert significant influence over computing in the U.S.

Although domestic manufacturers should continue to dominate computer-related markets in the U.S. for years to come, competition from abroad is now significant. Top executives of several leading American vendors have warned this year about competition from Japan, whose systems makers excel in hardware miniaturization and reliability.

European vendors, striving to free themselves from vendor-specific network architectures, have released protocol and data code converters that may sell well in this country, cutting many users' dependence on a particular vendor.

Added competition may distress some vendors, but it should pay off in better products and lower prices for users. In addition, foreign companies commonly need to work with U.S. software firms, OEMs and distributors to succeed with U.S. users. The foreign entries would therefore provide more business for such firms.

What is far more distressing for Americans is the comparative lead Japan and a few other nations are taking in computer literacy, a topic to be discussed at several NCC sessions this year. In Japan, computing is taught more extensively at precollege levels than in the U.S., where the shortage of qualified computing instructors has reached crisis proportions [CW, March 16].

As this trend continues, people in countries like Japan could become more knowledgeable than Americans in how to apply computer technology. Even if the U.S. continues to lead in developing that technology, the edge in applications expertise given to other nations could do more to undermine American prestige and influence in the world than the past 20 years' economic turmoil along with U.S. diplomatic and military fiascos.

NCC will also draw people from the UK and other countries where DP professionals have unionized and the social effects of computer technology, such as automation-induced unemployment, have led to programs of intense government regulation. This regulation is seen as constraining implementation in those countries and, as many have noted, similar regulation could happen in the U.S.

NCC is a good place for Americans to address such issues and, to the extent they are not addressed at this gathering, its service to the U.S. computing community may be questioned.

DATA PAST

Five Years Ago
May 3, 1976

DETROIT — Burroughs Corp. introduced the B80, a small general-purpose system designed primarily for business applications and featuring a double-sided floppy disk drive.

Ten Years Ago
May 5, 1971

PALO ALTO, Calif. — Salaries of programmers and other DP personnel had risen 1% to 2% in the last year, according to a survey by Source EDP, a placement firm. The Source conclusion differed from that of the Robert Half agencies, which had cited a 2% to 10% drop in starting salaries.

— — —

SANTA MONICA, Calif. — "There is no way today of measuring hardware efficiency, software efficiency or results," said Dr. Richard Hamming of Bell Labs, kickoff speaker for the first meeting of the ACM Special Interest Group on Compumetrics. "Here tonight we are founding an entirely new body of knowledge. Within 10 years, we will be able to predict reasonably well what the software and hardware will do and its uses for management."

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'Smile!'

LETTERS

Unwelcome Suggestion

After all that has been said about the inappropriate reporting level/function of the management information systems (MIS) activity, I was more than a little disappointed to see *Computerworld's* front-page article suggesting yet another "buffer" arrangement between MIS and central management ["Should MIS Manager Report to IRM Exec?" CW, April 13].

To add insult to injury, the article quoted a Dr. Elizabeth Adams of George Washington University basing this on the old canard that "information is too important to be decided by *technical* experts primarily interested in squeezing the last nanoseconds out of their computers." This is, to be overly polite, a lot of shuck and jive that went out in the early '60s (from the MIS community at least).

The majority of company managements still may think of us as "backroom technicians" rather than as valuable contributors to business management, and that view is only perpetuated by pronouncements such as that.

After nearly 30 years in this "technical profession" assisting management in every conceivable area of business activity, I still get quizzical looks when I note that I no longer write programs! And for me to suggest that MIS plans, sells, designs, schedules, produces, quality-inspects, field-supports, audits and so on, much like any engineering/manufacturing business in microcosm, never fails to startle the casual requester of MIS service, who seems to think we stand behind a Dutch door like the reproduction and blue print folks.

It's enough to make a grown man cry.

Tom O'Connor
Nashua, N.H.

Instruments of Nature

Another comment should be added to Ralph Struzziero's letter regarding the employer's perception of the role of recruiting firms ["On Hiring," CW, April 13].

In the DP community, there are some employers who view their professional staff as a sheikh views his harem — as property. The winning is the thing. But once won, some think, the employee need only be sustained, not maintained.

In a labor market where the highly skilled pro can very nearly write his own ticket financially, one might do well to consider why good people leave one firm and go to another. One factor is the staff: bright, incisive, productive people like to be surrounded by similar people. They enjoy learning from each other and enjoy shop talk on a reasonably high plain. Another factor is prestige by association; these valuable professionals like to know that their firm, division or branch is well thought of and that it is doing valuable work.

Other factors are common to any industry. Workers usually know when they are managed effectively and when they are not. And they prefer the former! Ours is still an immature industry with relatively few seasoned leader-managers. A manager who is tentative and afraid of exposing any professional weakness often frustrates and annoys the most productive subordinates.

In general, a company gets and keeps exactly the staff it deserves. If one manager experiences high turnover and low productivity, look to the manager. We in the recruiting business are merely instruments of nature, aiding her normal course.

J. Stephen Schiavo
Managing Partner
Romac and Associates
Arlington, Va.

READER COMMENTARY/Forest Woody Horton Jr.

Information Age Gives Productivity New Slant

Informed observers at last appear to be coming to the conclusion that productivity approaches appropriate to the Industrial Age are totally inappropriate to the Information Age.

The disciples of Frederick Taylor, Henri Fayol and Luther Gulick gave us this maxim: "Program the person to maximize the productivity of the machine." However, we should do just the opposite today in applying information technologies to the office, the laboratory bench and even in the home: "Program the machine to maximize the productivity of the person."

The former goal was indeed appropriate to the era of automobile assembly lines and widget manufacturing, wherein lay the source of much of America's greatness. After all, no other country had the capital base the U.S. had until well into the middle of this century. Moreover, we didn't suffer from the massive inroads now being made by the less developed countries in applying relatively cheap labor to the marketplace.

But the situation, as we all know, has altered radically. I hardly need mention the situation in Detroit, the gathering momentum of the Japanese in tackling the U.S.-dominated computer and telecommunications leadership and the tremendous difficulty in controlling spiraling wage demands.

Shop-Worn Ideas

And how is America responding? By trotting out the same shop-worn ideas we used when the steam engine caused gasps of marvel and excitement from people lining the shores of the Mississippi, and the Model T came bouncing along Pennsylvania Avenue at 30 mph!

Amitai Etzioni, the Carter administration's high priest of "reindustrialization" (that's the code word for a Chrysler bail-out by government) told us that the answer to the country's productivity problems is to dust off the assembly line and speed up the machines on the plant floor. Attacking Daniel Bell and other Information Age leaders as "misguided," Etzioni lambasted the potential of information technologies in helping put America back on her feet with his buggywhip ideas which, in my view, amount to nothing more than pouring good money after bad (to put the best light on this industrial engineering mentality of the 1920s). At worst, this philosophy could seriously mislead both private- and public-sector efforts to build on the country's *current* strengths, not historical ones.

America is in deep economic trouble, and the mindless pursuit of such catchy phrases as reindustrialization is another case of trying to apply a Band-Aid to a hemorrhaging patient. The sector-by-sector bailout approach begun by the last administration and now tempting the current administration must be seen as bankrupting — both metaphorically speaking and in a literal sense.

Brains vs. Brawn

What is America's current strength? Simply stated, it is its *intellectual* asset base — no longer its capital assets or its "labor" assets. What's the difference between intellectual and labor? Surely every elementary school child knows it's the difference between brains and brawn. But do our economists know that? Apparently not, because they have, thus far, made no effort to distinguish between intellectual products and labor services in the official National Income and Products Accounts calculations. These are the very cornerstone of all of the economic statistics we use to formulate fiscal and monetary policy, publish official government manufacturing and labor statistics, generate the whole family of economic indicators and so on.

Brains and brawn are mixed together in the same economic pot, and as a consequence, our political leaders, corporate executives, academic and research institutions and professional economists are forced to develop space-age policies based on high-button shoe statistics.

Information Age observers now recognize that information — the result of intellectual know-how — must come to be regarded as a real economic commodity. But our formal economic and accounting machinery does not yet permit the systematic illumination of either the market value or cost of intellectual goods and services.

(Continued on Page 67)

SOFTLINE/Werner L. Frank

What Limits to Software Gains?

Recent literature has highlighted the many application development problems facing the typical installation. They include the following:

- Sites face sizable backlogs, often expressed in terms of the existing staff's capacity — that is, two to three calendar years of effort or 10 to 20 applications.
- More than 50% of the budget is devoted to maintaining or rewriting old systems.
- Less than 20% of the systems staff can be deployed for new development efforts.
- Programming costs are increasing and outpacing dollars spent for hardware.
- A good part of developed software is never effectively used.

A number of voices cry out with varying views and suggestions to alleviate this pressure. The most notable and useless advice is to employ only the very best personnel. It has been shown that the variance in capability between the average and best of programmers and systems people is enormous. But the shortage of skilled DP personnel and the inability to concentrate the top performers make this productivity-enhancing suggestion a dream.

Another group seeks to avoid the basic problem of programming in the first place. These individuals say that new development activities should be minimized. They recommend quick, and perhaps "dirty," solutions by using existing general-purpose data management systems or, as they are often called, application generators. They belong to the "install now, program later" school popularized by R.C. Kendall. This group also conceives of prototyping or breadboarding a solution and incrementally modifying, evolving and improving a solution. It would maximize the use of existing software modules and build an application within the framework of available systems.

Tools, Techniques

A third set of recommendations comes from those advocating productivity enhancement tools and techniques. These suggestions support the efforts of modern technology to better organize the process of developing and operating software systems.

Included in this set of suggestions are better use of existing program-

(Continued on Page 70)

POTENTIAL PRODUCTIVITY IMPROVEMENT
SYSTEM DEVELOPMENT

	CURRENT COST	% IMPROVEMENT	NET COST
OBJECTIVES/REQUIREMENTS	2	0	2
EXTERNAL SYSTEM DESIGN	8	25%	6
INTERNAL SYSTEM DESIGN	10	20%	8
PROGRAMMING SPECIFICATIONS	12	40%	7
CODING	13	75%	3
UNIT TESTING	24	50%	12
INTEGRATION TESTING	13	30%	9
DOCUMENTATION	6	30%	4
SYSTEM TEST	12	25%	9
TOTAL	100	40%	60

Figure 1

POTENTIAL PRODUCTIVITY IMPROVEMENT
TOTAL LIFE CYCLE IMPLEMENTATION

	CURRENT COST	% IMPROVEMENT	NET COST
SYSTEM DEVELOPMENT	100	40%	60
INSTALLATION			
CONVERSION			
TRAINING	15	20%	12
MAINTENANCE (= 3 X DEVELOPMENT)			
DEFECT REMOVAL (20%)	60	75%	15
ENVIRONMENTAL CHANGE (20%)	60	30%	42
ENHANCEMENTS (60%)	180	40%	108
TOTAL	415	43%	237

Figure 2

Productivity Survey

Please assign numerical rankings to the major productivity factors at your installation: outstanding — 5; excellent — 4; satisfactory — 3; marginal — 2; unacceptable — 1.

1. State-of-the-art technology ________
2. Concepts understanding ________
3. Technical skills ________
4. Physical environment ________
5. Personnel development ________
6. Management structure ________
7. Technical/administrative support ________
8. Other________________
9. Other________________
10. Other________________

Total Points ________
Overall Rating ________

Comments on the overall effectiveness of your organization's productivity program may be included on a separate sheet.

Send to Jack Stone, Suite 1, 1317 Rhode Island Ave. N.W., Washington, D.C. 20005.

THE HUMAN CONNECTION/Jack Stone

Is Productivity Quest Going Well at Your Site?

Although many old-timers in DP may disagree with me, "productivity" is not just another faddish term within the systems development community. Increased productivity of the systems staff — and end users — is critically important to all information managers who are battling hard to stay on top of the systems development work load.

This column is intended to review the factors involved in productivity and stir reader response on how the quest for productivity is faring in computer centers around the country.

Many people in the industry — particularly the vendors — seem to think that the magic formula for productivity gain is some new hardware/software product that is simply tossed into the DP cauldron. But this isn't the way life really is. The introduction of new technology equates to better tools, but only implies improved productivity. If the users, for whatever reasons, cannot or will not employ the tools as intended, productivity gains will be less than expected — or, at worst, illusory.

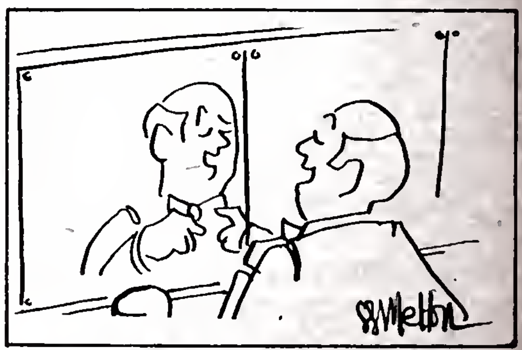
Here's only one example. I recently conducted a seminar for prospective terminal operators of a planned distributed data processing (DDP) network intended to support both word processing (WP) and DP applications. The operators already had had many months of WP experience on some powerful WP systems, and my seminar was designed primarily to extend their WP knowledge. But I was surprised to learn that the operators were totally ignorant of such fundamental capabilities as global pagination, automatic page numbering and global copy.

To use computer-based tools effectively, people must have an environment that motivates individuals to perform at their best, but within the context of team operations.

Some of the key environmental factors are these:

- The availability of state-of-the-art tools and techniques.
- A general understanding of technological concepts and how they are applied in immediate situations.
- Technical skills to develop and maintain systems and diagnose operating problems.
- A physical environment that allows the human intellect to function as it should.
- A personnel development program in which the use of advanced tools and techniques is appropriately tied to professional growth and job advancement.
- A management structure that clearly identifies interacting responsibilities, delegates tasks to be done in a realistic manner, appraises employee performance in a timely way and provides for an equitable reward/penalty system.
- Technical and administrative support that relieves personnel of unnecessary responsibilities.

Readers are invited to express their views on the productivity program at their installations by completing the survey form on this page.



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NIXDORF
COMPUTER

LETTERS

Myth Persists

"Software does not deteriorate, so it is not subject to maintenance." I made that statement more than a year ago in a commentary called "The Myth of Software Maintenance" [CW, Feb. 18, 1980]. Nothing has changed since then. Software still does not ordinarily deteriorate. However, people stubbornly continue to write about the problems of "software maintenance."

What difference does it make if software people misidentify the work which they claim occupies more than 50% of their time? First, it makes them sound as if they don't know what they are doing.

Their peers in other technically based professions — architects, engineers, plant supervisors and so on — have to be concerned with *real* maintenance which must be planned for and performed on physical plants and equipment. If they were to notice that there is no proper analogue between so-called "software maintenance" and the physical maintenance they must accommodate, they could justifiably accuse software people of being sissies or crybabies or worse. A better source of mutual disrespect would be hard to imagine.

Second, nonsense about "software maintenance" misleads the sponsors of software projects — the clients and the managers who are entitled to know what they are paying for. A naive sponsor might be convinced that the high cost of "maintenance" is attributable to breakdowns which "just happened." This is wrong, of course, since almost all software defects and deficiencies stem from bad specification, poor design and sloppy construction — very few from natural accidents.

At the other extreme, a conniving sponsor might try to sneak major redevelopment efforts in under the "maintenance" umbrella. That, too, is very misleading to those who are ultimately accountable for the true costs of software alteration.

Third, failure to appreciate the nature of software work confuses software professionals and thus retards the development of professional software engineering. Software is not maintained — it is *revised* to correct or enhance an existing specification, design, program, document, standard or plan.

Anyone who expects to perform only maintenance after one big push of development has failed to appreciate the continual redevelopment cycle through which software evolves.

Don McNeil

Bridgeport, Pa.

DP and Democracy

Regarding "City DP Seen Eroding Democracy" [CW, March 30]:

Our company is heavily involved in county government data processing. We use our influence to direct the political body toward computing with the constituency in mind. Providing the best possible services for the tax dollar gets politicians re-elected. Our systems allow for faster service to the citizens and offers them a larger base of information.

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Roger A. Lewis
President

Computer Pacific Corp.
Vancouver, Wash.

New Slant To Productivity

(Continued from Page 65)

It's time we revitalized "information economics" and stopped assuming that throwing more and more machines into the officeplace is, as if by magic, going to improve productivity of the people who really count — the middle managers and the professionals. They are the ones we should really support with all of the mainframes, minis and micros, as well as the reprographic, micrographic and telecommunications networks, including the teletext technologies.

Oh, to be sure, word processing machines do benefit clerical and secretarial productivity. But processing words faster and cheaper does not equate to generating ideas faster and cheaper. In short, innovation, creativity and genius do not come from using an electronic dictionary to correct an "instant author's" misspelling!

We must crank intellectual goods and services, somehow, into our capital and labor account calculations if we are ever to harness the full power and versatility of modern information technologies and truly increase productivity in the plant, the laboratory, the office and, eventually, in the emerging home electronic/information cottage industries. Neither "hard" goods and services nor muscle power do economic justice to America's intellectual power base. Let's start finding out how to maximize people, not just machines!

Horton has directed management information systems in the Executive Office of the President, the Office of Management and Budget, the Environmental Protection Agency and the Department of State.

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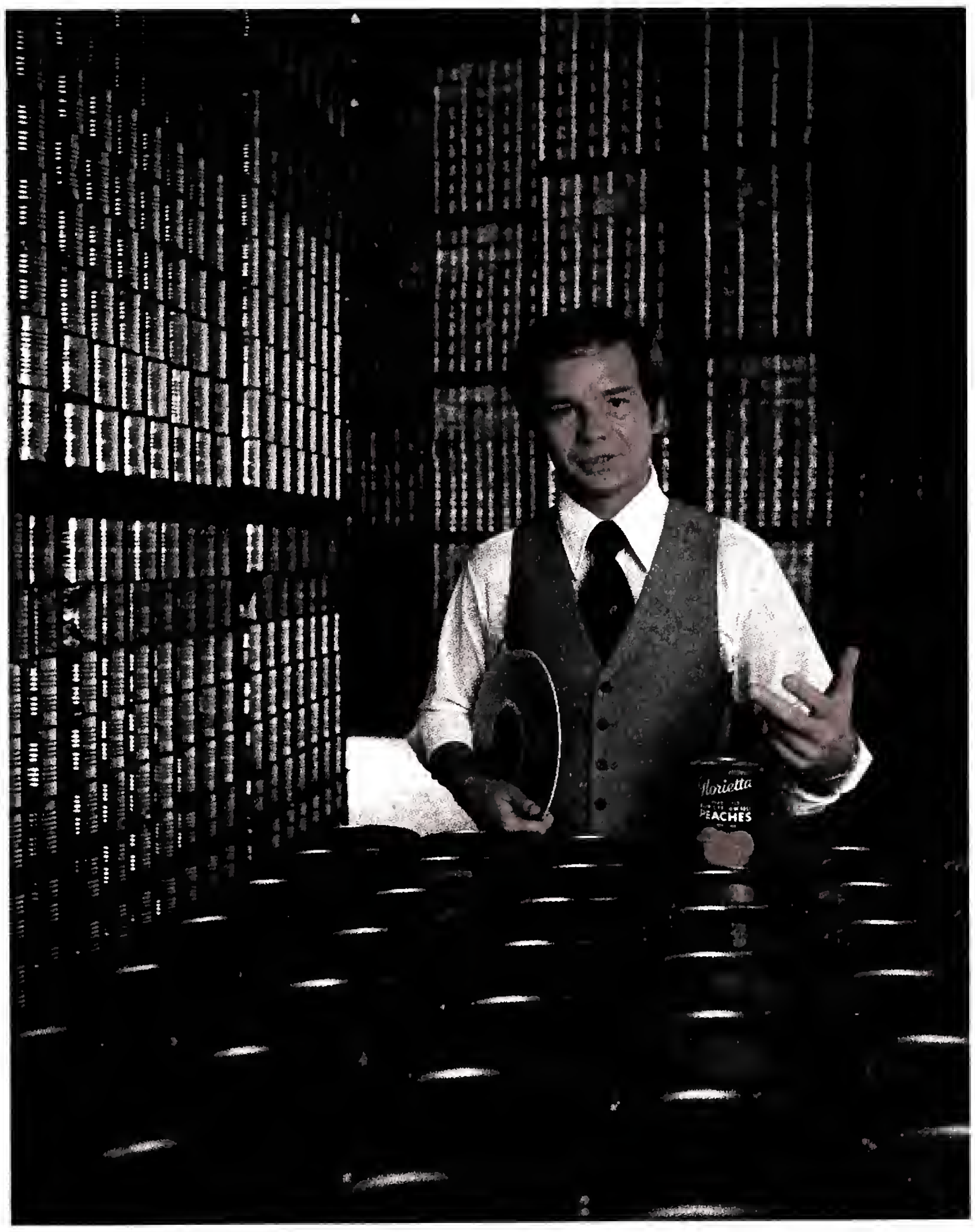

**Bob Scully, Marketing Manager
Glorietta Foods, San Jose, CA**

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What Limits to Productivity Gains?

(Continued from Page 65)

ming languages and even the development of improved languages. Coupled with this language focus are the various methodologies advanced for structuring the design specifications and programming process itself. With this structured discipline, its advocates argue, the construction process is enhanced and under better control.

Related to the program construction process is the notion of the programmer workbench. This approach to increasing productivity assumes that the ready availability of a combination of software and hardware tools for organizing and controlling the programming process will enhance programmer performance.

A slightly different approach to improving productivity is advocated via performance enhancers that aim at improving the operation of a completed system by either more efficient execution of existing code through a tuning process or the enhancement of the operating environment with better utilities.

Vendor products for improving productivity address various parts of the overall application development and operation cycle. One might conclude from vendors' assertions that using any one of their offerings would immediately and dramatically benefit the end user. One is tempted to conclude that by using many of the suggested improvement techniques, one could gain a tremendous productivity jump.

We set about to test this hypothesis by identifying the various component steps in system development and operation and analyzing the productivity potential of each.

Consider first the system development process and nine component steps with their associated cost breakdown. Shown in Figure 1 (on Page 65) are the maximum improvements feasible for each component step based on the best available technology today.

It will be noted that the coding process can achieve a maximum improvement of 75%, whereas the statement of objectives and requirements will probably remain a totally manual process with no real improvement possible.

The impact of maximal improvements for each component step, assuming independence for each such step, is seen to be 40% for the overall system development process, or a productivity increase of 67%.

We take these results one step further to determine what overall improvements are achievable during the total life cycle of an application. Figure 2 shows, in addition to the system development process, what can be achieved during the installation and maintenance phases. In this model, the maintenance effort is assumed to have a cost of three times that of the development cycle. Furthermore, maintenance is assumed to break down into 20% for defect removal, 20% to account for environmental changes and 60% reflecting enhancements made to the basic application.

The total improvement during the overall life cycle of the application is thus seen to be 43%, leading to a net cost which, at best, is 57% of the current expected life cycle costs. In other words, by employing currently available techniques, productivity can be expected to improve by 75%.

Since each predecessor step in the software construction process affects subsequent events, it may even be possible to achieve somewhat better results over this entire process.

This expectation of potential productivity improvement for customized systems should be contrasted with alternatives such as purchasing off-the-shelf finished software products or using a data management system. For certain applications, the latter two options (discussed in last week's column) may provide improvement factors that are several times better.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

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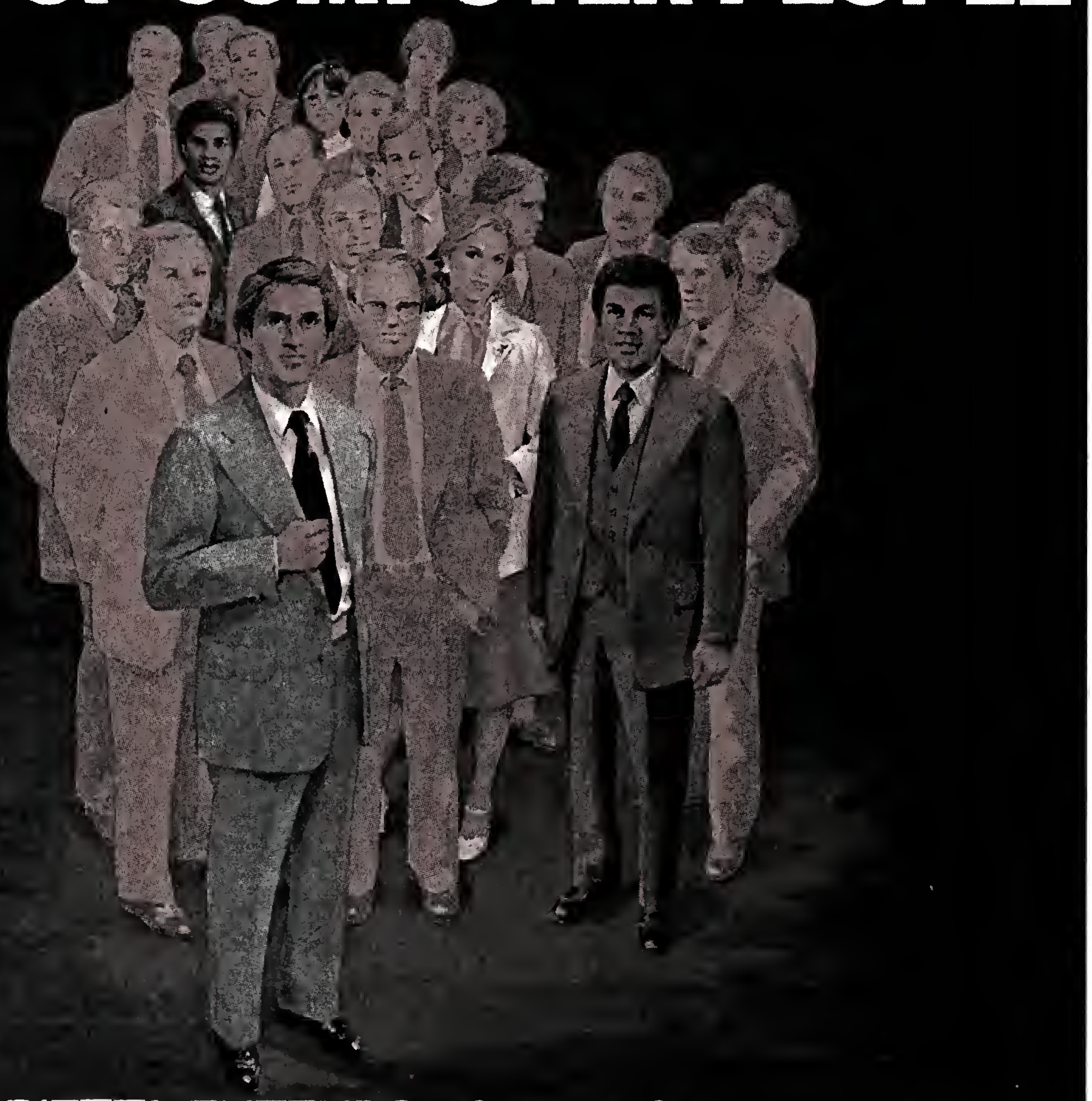

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'Vollie' Updated For IPO/E

PRINCETON, N.J. — The availability of DOS/VSE IPO/E support with Version 3.0 of Vollie, its on-line programmer productivity aid for DOS/VS and DOS/VSE operating systems, was announced here by Applied Data Research, Inc.

Vollie's IPO/E support is said to be a functional replacement for IBM's ICCF IPO/E and to use fewer CPU resources than ICCF. Current Vollie customers with maintenance will receive IPO/E support at no extra charge. New users will receive IPO/E support as part of their Vollie system.

Like ICCF's IPO/E, Vollie's IPO/E operates in conjunction with IBM's interactive productivity facility (IPF). Vollie can generate a DOS/VSE operating system, install IBM program products, execute system utility programs, apply monthly maintenance to the operating system and program products and pro-

(Continued on Page 73)

'Inquiry' Gets UDO Feature

WOODLAND HILLS, Calif. — Informatics, Inc. announced here the availability of a User Defined Output (UDO) feature, concurrent with Release 4.1 of Inquiry IV/IMS, its on-line data base information retrieval system for users of IBM's Information Management System (IMS).

UDO will be incorporated into the language syntax of the data base system, the vendor said, facilitating use of this feature by end users and DP professionals.

UDO will enable users to format output displays of data retrieved from IMS data bases using Inquiry IV/IMS query

(Continued on Page 73)

Runs Price, Hardware Gamut

RDC Profiles Finance Planners

By Rita Shoor
CW Staff

STAMFORD, Conn. — If you are shopping for an interactive financial planning system, there is a plethora of packages waiting for you that range from a $300,000 integrated system designed for large-scale IBM hardware to a $1,500 system for Apple Computer, Inc.'s Model II microprocessor, according to the recently released *Financial Modeling Decisions* report from Real Decisions Corp. (RDC).

The wide cost and hardware spectrum of financial modeling systems became apparent in RDC's survey of some 30 such systems offered by time-sharing vendors and software development firms. Four new systems were added to the report since its February 1980 edition:

- Autotab 300, a turnkey system from Capex Corp. utilizing Hewlett-Packard Co. Model 300 hardware.
- Finar, a package from Finar Systems, Inc. designed for Digital Equipment Corp.'s PDP-11.
- Model from Lloyd Bush & Associates for the DEC VAX-11 and hardware from Prime Computer, Inc.
- RCS from Ferox Microsystems, Inc. for the Apple II micro.

Major Trend

One major trend confirmed by the RDC study is a movement toward financial modeling software for minicomputers and/or microcomputers; another is the increasing availability of this software for in-house installation. Only three of the 30 products surveyed continue to be offered exclusively through time-sharing vendors' services.

International Data Corp. (IDC), a market research firm in Framingham, Mass., seems to be in agreement with RDC's findings. In its *Independent Packaged Software Reference Book*, a survey of financial software suppliers, IDC said that most vendors interviewed predicted an increase in purchases of in-house systems for financial forecasting and planning.

The result is that firms that offer accounting-oriented financial software are adding financial modeling capabilities and packages to their product lines (see story on Page 1).

Other contrasts in RDC's study include great variations in the amount of code required for programming specific tasks; "vastly differing" approaches in modeling systems as to which capabilities should be programmable and which should be automatically offered to the user; and a wide range in the number of built-in financial and statistical functions among the various packages.

These capability comparisons were derived through a set of six benchmark problems designed to emulate real-life requirements in modeling and reporting, RDC said. The benchmarks included: new product planning, cash flow analysis, long-range plan, pro-

(Continued on Page 73)

Systems Studied by RDC

- **Autotab 300**, Capex Corp.
- **Cuffs**, Compuserve, Inc.
- **Cuffs**, Informatics, Inc.
- **Data*Model**, Minicomputer Modeling, Inc.
- **EIS**, Boeing Computer Services, Inc.
- **Empire**, Computer Sharing Services, Inc.
- **Empire**, Data Resources, Inc.
- **EMS**, National CSS, Inc.
- **Enterprise**, Citishare
- **Express**, Tymshare, Inc.
- **FAL II**, General Electric Information Services
- **FCS**, Comshare, Inc.
- **Finar**, Finar Systems, Inc.
- **Fiscal**, Rapidata, Inc.
- **Flares II**, Computer Sciences Corp.
- **FML**, ADP Network Services, Inc.
- **Foresight**, United Computing Systems, Inc.
- **FPS**, STSC, Inc.
- **IFPS**, Control Data Corp.
- **Impact**, Informatics, Inc.
- **Infotab II**, National CSS, Inc.
- **Maps**, Ross Systems, Inc.
- **Model**, Lloyd Bush & Associates
- **OLSFMS**, On-Line Systems, Inc.
- **Plancode**, IBM
- **Proforma**, Warner Computer Systems, Inc.
- **Prophit II**, Service Bureau Co.
- **QED/Insight**, Time Sharing Resources, Inc.
- **RCS**, Ferox Microsystems, Inc.
- **Simplan**, Avco Computer Services
- **Simplan**, Informatics, Inc. (Informatics, Inc. is now "disassociated" from the Simplan package and takes "no active part" in marketing it, according to Richard F. Carlsen, director of marketing.)
- **Xsim**, Interactive Data Corp.

IBM's RMF "126% Off Mark" CW Reports. QCM Needed!

1/19/81 . . . Two independent studies reported by Computerworld noted that IBM's Resource Monitoring Facility (RMF) monitoring of CPU and I/O utilization "suggests discrepancies," "severely underestimates," and can cause "inaccurate estimating" of proposed enhancements up to 126%!

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SPM-Systems Performance Module: Provides management reports for diagnostic performance measurement, capacity planning and fine tuning.

SPI-Systems Performance Interrogator: An online performance and analysis facility for operator and TSO consoles. Contains powerful exception reporting facilities.

JAB-Job Analysis and Billing: Most accurate and repeatable accounting and billing system available. Uses QCM methodology to supplement SMF. Flexible allocation and cost distribution.

BCO-BYTE/SIO Counting Option: Directly counts IO's and the number of bytes transferred at the job, device, channel and control unit levels—a necessary requirement for anyone seriously concerned about capacity planning, accountability, and system tuning.

SDSI-Shared Data-Set Integrity

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Utility Programs Offered For VM/370 With CMS

VIENNA, Va. — VM Software, Inc. (VMSI) announced here the first of its system software products targeted at users of IBM's VM/370 operating system with CMS.

VMBackup is a suite of VM utility programs, which provides full disk backup and recovery services for users of both CMS and non-CMS minidisks. It offers selective dumps and retrievals under user or installation control.

Security features include file password protection and data encryption. VMBackup also includes operations assistance and support features, on-line operation and the ability to do restart after system crash.

Installation instructions, a reference manual and a user's guide are supplied as part of the license price for VMBackup, which is $4,995 until July 31 and $8,550 thereafter.

The vendor can be reached through P.O. Box 985, Vienna, Va. 22180.

RDC Study Profiles Planners

(Continued from Page 71)

ject financing, sales-driven model and short-term model.

Financial Modeling Decisions also disclosed wide variations in the costs of using financial planning systems through time-sharing services, RDC noted.

The 800-page study costs $995; purchasers of the full report automatically receive updates and additions throughout 1981.

Mini reports including three to eight systems can also be extracted to create a customized, smaller report. These prices start at $250 for a three-system report and go in $75/system increments to $625 for an eight-system report, RDC said from its headquarters at 123 High Ridge Road, Stamford, Conn. 06905.

'Vollie' Update Supports IPO/E

(Continued from Page 71)

vide host system support for the interactive execution of IPF for all users of DOS/VSE Release 2.

Support Details

Host system support means that Vollie stores all IPF panels and interactive dialogues on its own on-line library in a compressed format; its terminal support is functionally equivalent to and completely replaces that provided by ICCF; and its library conversion program allows the loading of IPF and ICCF data into the Vollie on-line library.

In addition to IPO/E support, Version 3.0 of Vollie includes expanded library capacity and a revised JCL syntax checker that has been enhanced to include support for DOS/VSE Release 2 and Release 3 JCL conventions.

The permanent license price for Vollie, which includes IPO/E support, is $15,500. Monthly, three-year and five-year leases are also available, the vendor said from Rt. 206 and Orchard Road, CN-8, Princeton, N.J. 08540.

UDO Offered

(Continued from Page 71)

language. It provides control over the output display of data, as well as automatic functions such as date and page number.

The UDO feature is offered as part of Release 4.1 of Inquiry IV/IMS. A typical price for the Inquiry IV/IMS system is $50,000, not including maintenance, the vendor said from 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

'Dataplan' Runs On System/38

CONCORD, Calif. — Dataplan, a financial modeling package for the IBM System/38, is available from Johnston, Brown & Associates, Inc.

Developed by Business Management Systems of Brisbane, Australia, Dataplan was designed for use by nonprogrammers and includes a libarary of financial and forecasting routines, "what if" capability, sensitivity analysis and a report generator.

The perpetual license fee is $18,000, including a two-day implementation class at the user site and the first year's maintenance and enhancements. The vendor can be reached at 1465 Enea Circle, Building E, Concord, Calif. 94520.

Design Users Get Series/1 Tool

LAWRENCE, Kan. — Evans, Bierly, Hutchison & Associates (EBH) is offering a business and technical package for IBM Series/1 EDX users in the design industry.

Written in Fortran IV and designed for the engineer/architect office, the programs provide accounting and bookkeeping, personnel record and payroll, and project record and control systems, the firm said.

The three individual business programs identified by EBH as its Design Professional Accounting System (DPAS) package are available for $2,800 each or may be purchased at $8,000 for the DPAS package. EBH is at 1910 Haskell Ave., Lawrence, Kan. 66044.

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'Docudump' Maintains IBM Sites

MILWAUKEE — A software package said to provide the system programmer at IBM sites with methods for the orderly storage, retrieval and general management of stand-alone and SVC-DAR-type dumps has been announced by Weststar Systems, Inc.

Docudump maintains statistical information about each dump, which is compressed and kept on a direct-access file, the vendor spokesman said.

It operates on all VS1, SVS and MVS systems, the company said.

Docudump is available immediately and is priced at $3,800 per site from Weststar Systems, Inc., P.O. Box 08319, Milwaukee, Wis. 53208.

'Dossier' Updated for VSE

PORTLAND, Ore. — Computer Concepts, Inc. has expanded its Dossier documentation tool for IBM DOS/VSE users to automatically document VSE concatenated libraries.

The expanded documentation tool for Dossier is available at no extra charge to Dossier users from Computer Concepts, Inc., 6443 SW Beaverton Highway, Portland, Ore. 97221.

Field, File Packages Fit System/3, System/34

RESEDA, Calif. — Hawkeye Information Systems has announced two packages to standardize field and file names on IBM's System/3 and System/34.

Data Base/38 standardizes field names in RPG-II programs on System/3 Models 8-15D and on System/34. The package reportedly standardizes field names 10 times faster than IBM's equivalent program product. The package costs $1,200.

File Re-namer/Plus standardizes file names and/or labels in OCL and RPG-II programs. It provides edits and documentation for any System/3 installation going through a conversion. The package costs $1,000.

Hawkeye noted both packages were originally designed for System/3 and System/34 users converting to System/38. But the firm said users who were not considering such a conversion could also beneift from the packages. The firm can be reached through P.O. Box 1194, Reseda, Calif. 91335.

'WP/1' Linked With 'Prompt'

SAN JOSE, Calif. — Systar Corp. has announced an enhancement to its WP/1 word processing package for the IBM Series/1 that provides menu selection for editing and file management functions.

WP/1 now interfaces to Prompt, a data base management facility for the Series/1. Built around the Prompt data base facilities are financial application software products such as general ledger, accounts payable, payroll, accounts receivable, order entry and inventory control.

The interface program allows a user of both Prompt and WP/1 to access information from a Prompt data base for inclusion in a WP/1-created document.

The packages can be used on the IBM 3101 and 4978 terminals and will support EDX Versions 1.1 through 3.0. The Prompt interface program is available immediately for a one-time license fee of $500, and the WP/1 program carries a one-time license fee of $2,500 from Suite 208, 1762 Technology Drive, San Jose, Calif. 95110.

System/38 Gets Word Processing

SAN DIEGO — Word processing software designed for the IBM System/38 and said to maximize productivity in text entry, revision and printing has been announced by Integrated Systems Management, Inc.

The ISMWP/38 provides full-screen text entry, heads-down keying and textural and data manipulation.

The ISMWP/38 is priced at $950 for the object module with an additional $350 for an optional global module from Integrated Systems Management, Inc., Suite 3121, 2515 Camino Del Rio South, San Diego, Calif. 92108.

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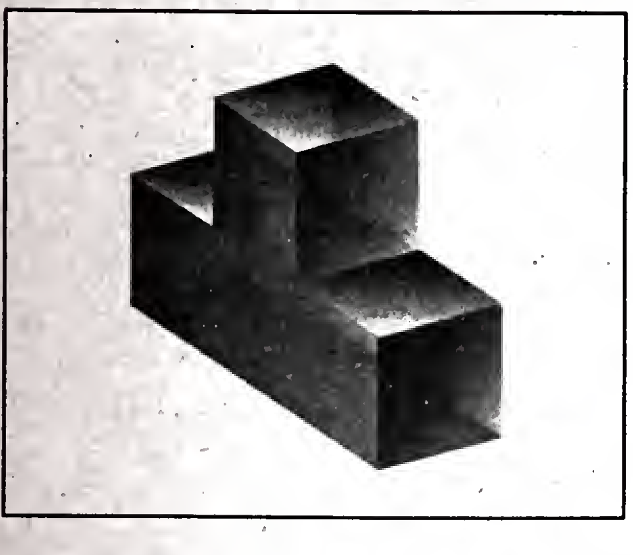

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The **Multiple Systems Manager** manages the allocation of TAPE and MOUNTABLE DISK devices across all systems in your complex. It allows you to operate normally with all devices ONLINE to all systems. MSM insures that device allocation by jobs in different systems occurs just as if all jobs were operating in one single unified system.

MSM eliminates the operational burden of juggling TAPE and DISK units among systems. It protects against the danger of a system accidently rewinding or overwriting a TAPE in use on another system; this removes the single greatest cause of shared tape mishaps.

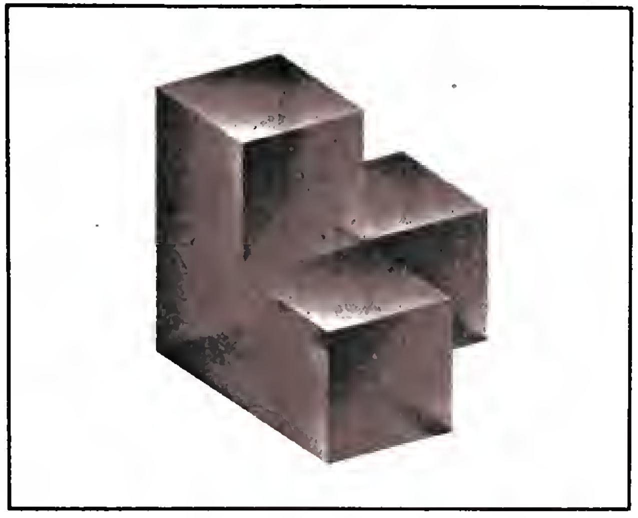
MSM will use your TAPEs and DISKs more efficiently—which can result in immediate device cutbacks or (more likely) postponement of future acquisitions.

MSM is so transparent that it can be operated without the use of any new operational commands. Of course, there are powerful new commands available—however these are extras, not necessities.

Only MSM allows such truly NATURAL and transparent shared device management.

Other features (for MVS environments only): The MSM Device Preferencing capability allows devices to be dynamically structured into a hierarchy of sets; MSM insures that units in preferred sets are used, whereever possible, before less preferred sets.

The MSM SOFTSWAP™ feature insures that DDR device SWAPs for TAPE units will NOT impact JOBs or TSO users which are not using tape allocation. Without SOFTSWAP™, TAPE DDR SWAPS are likely to impede all allocations in a system—including even those which do not use tape.



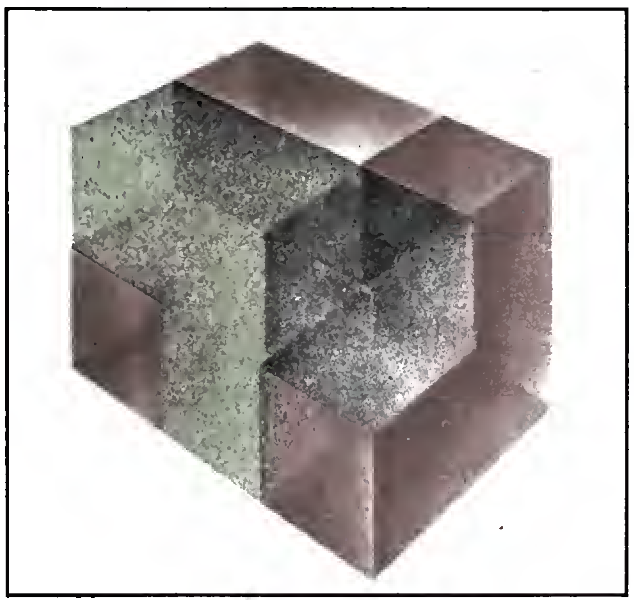
SUPER-MSI™
Multiple Systems Integrity Facility

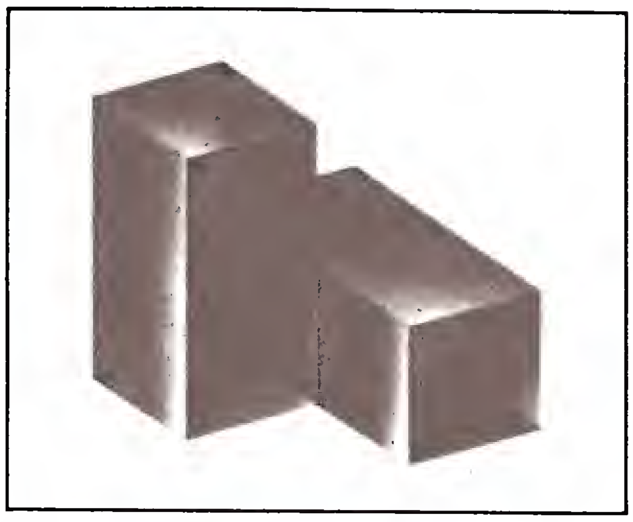
UNIFIED DATA INTEGRITY

The **Multiple Systems Integrity Facility** provides the same thorough dataset integrity protection for jobs in different systems that would exist if the jobs were in the same system. In addition to propagating "standard" dataset integrity across systems, Super-MSI also insures that the VSAM "internal" SHAREOPTIONS are honored throughout your entire complex. Effective cross-system VSAM integrity can be obtained in no other way than through the use of Super-MSI.

Another feature: Super-MSI also eliminates the hardware RESERVE lockouts which are normally inherent with SHARED DASD in multiple system environments.

Much more besides: Super-MSI has many other exciting features including special aids for operators and TSO Users. All in all, Super-MSI will be a very powerful addition to your installation.





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Global Console Director

UNIFIED OPERATOR CONSOLES

The **Global Console Director** is an extremely flexible tool. It allows (selected) message streams from different systems to be logically "blended" to create a unified system image (to whatever degree desired). In a slightly different vein, GCD allows any console on any system to be logically attached concurrently (and perhaps in different ways) to any set of systems in your complex! GCD allows commands entered from any console to be directed and processed anywhere in the complex; in this respect, all consoles are effectively linked to all systems. In almost every aspect, GCD is philosophically and operationally compatible with the standard system console support.

GCD can improve overall throughput by simplifying operations. By allowing several physical consoles to be logically merged, excess devices can be eliminated for immediate savings, or deployed elsewhere to strategic advantage.

GCD is absolutely transparent to your users, and aside from major simplifications, nearly transparent to operations.

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Allen Services' line of software packages for Multiple System environments, allows an entire complex of systems to be treated almost as though it were **one single unified system.** The complete "unified system" effect is achieved through combined use of three independent (but related) program products. Each of these, Super-MSI, MSM and GCD addresses distinct concerns present in multi-system environments.

Of course, since the products are independent, if you aren't yet ready for the full-blown unified system effect, you only need to select the products which interest you. If you wish to use more than one of the above products, they can be integrated together into a **single control task** (thus further reducing overhead complexity). In nearly every instance where our products have been competitively evaluated against all possible hardware or software alternatives—our software has been chosen. Aside from IBM, Allen Services has been providing commercial software specifically designed for multiple system environments longer than any other company. Over 500 major installations throughout the world have already selected our products as the preferable means of handling problems associated with multiple system environments. The number grows daily. Reliability has always been an integral part of our design.

When considering software, most people consider support to be a very important factor—Allen Services has over 200 support personnel.

The only other comprehensive approach to unifying multiple systems is JES3 (or ASP). Aside from the fact that MSI/MSM/GCD can be installed and implemented in only a few minutes, there are several other significant differences from JES3: For example, MSI/MSM/GCD (combined) use only 1% to 2% overhead: MSI/MSM/GCD are invisible to your users; MSI/MSM/GCD were designed to be strictly compatible with OS/VS/MVS philosophies—in this regard none of your personnel will require re-training. The majority of all eligible multiple system installations are now using our products to help manage their systems.

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'Tolas' Updated to Run On PDP-11 Under RSTS/E

PITTSBURGH, Pa. — Transcomm Data Systems, Inc. here announced the availability of its Tolas financial systems on Digital Equipment Corp.'s PDP-11/23 and PDP-11/24 running under the RSTS/E operating system.

The Tolas systems include accounts payable, accounts receivable, fixed assets, payroll, general ledger/financial reporting and a special interface to Finar, a financial analysis and planning module.

The DEC computers on which Tolas is available range in size from the PDP-11/23 with up to eight interactive users to the PDP-11/24 with up to 16 users.

Prices of the Tolas systems range from under $60,000 for a PDP-11/23 with two financial applications to about $100,000 for a PDP-11/24 with all six financial applications.

Transcomm is located at 1380 Old Freeport Road, Pittsburgh, Pa. 15238.

RT-11, RSTS/E Gain Compiler

SUDBURY, Mass. — EEC Systems has announced a Cobol compiler for the Digital Equipment Corp. RT-11 and RSTS/E operating systems that it said is made specifically for small business applications.

The RJ-11 consists of a compiler, run-time system and supporting programs designed to run on a DEC PDP-11 computer and works with floppy disks, the vendor said.

Utility programs are provided to print the contents of files or program results, sort files, update files, print file details and extend files, the vendor claimed.

The RJ-11 for RT-11 is priced at $2,500 and at $5,000 for RSTS/E from EEC Systems, 315 Goodman's Hill Road, Sudbury, Mass. 01776.

Cobol System Fits RSX-11M

SAN DIEGO — An Ansi-74 Cobol compiler and run-time system for the RSX-11M operating system on Digital Equipment Corp.'s PDP-11 processor was announced here by Benson C. Stone & Associates, Inc.

Its features include the capacity to handle large source programs and the use of two run-time task spaces for data, object program and run-time support software, using Mapped Memory management with a total availability of 128K bytes.

A single-system binary license sells for $3,950 and includes a one year warrantied product support. Additional years of continuing support are available at $395 per year.

The vendor may be reached through P.O. Box 28658, San Diego, Calif. 92127.

Debugger Designed For PDP Under RSX

SOUTH PLAINFIELD, N.J. — A Fortran IV program debugging package designed for Digital Equipment Corp. PDP-11 minicomputers using the RSX-11M operating system is available from Computer Interface Systems, Inc.

Xbug allows a Fortran programmer to place breakpoints at any statement in a program, step through a program statement-by-statement, examine and change variables and cause breakpoints to occur whenever a selected variable changes value, the vendor said.

Xbug is available for a license fee of $995, including documentation and a one-year update service from Computer Interface Systems, Inc., 124 McKinley St., South Plainfield, N.J. 07080.

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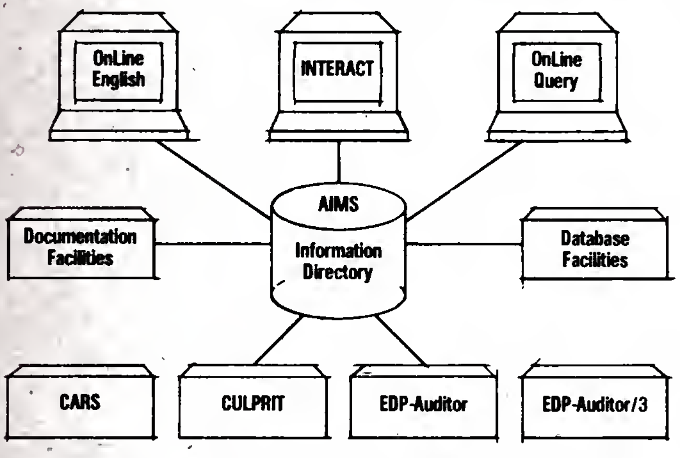

1. Vendor Record: Cullinane Database Systems, Inc., is the most financially successful database software company with the best growth record and highest earning rate of all software companies. As a result, in 1978, Cullinane was the first computer software company in ten years to have a public offering, thus providing substantial financial resources for product enhancement, new product development, and company operations.

2. Audit Control and Integrity: The Information Directory (ID) is the control center for AIMS. Directory contents are automatically updated, assuring accuracy and consistency of all data resources. The ID also sets standards for data names across all systems, programs, and files, facilitating communication between data processing and end-user departments. Furthermore, the ID maintains relationships between systems, users, programs, and data elements, providing a monitor for the impact of proposed design changes on the system.

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5. Hardware Independence: AIMS includes Cullinane's CARS Audit Software System. CARS is particularly important to organizations faced with auditing a wide variety of computer hardware. CARS provides the capability to audit most computer systems, including IBM, Honeywell, Wang, Digital Equipment Corporation, Data General, NCR, and others.

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26 Albuquerque, NM
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CW-5/4

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Time Standard System Debuts

CHICAGO — Data Accumulation and Retrieval Times (Dart), a software system with which business and manufacturing companies can reportedly update time standards, was introduced here by H.J. Hansen Co.

Dart can update standards for any manual work operation performed in industry, commerce or government, according to Hansen. This includes heavy construction equipment manufacturing, meat packing, ballpoint pen assembly, letter filing and mail sorting.

The system was designed to automatically find and update all standards affected by the change. It also tells how any change in procedure or equipment will affect labor or machine time, and product or service cost.

Dart's software costs $15,000. It is programmed in University of California at San Diego Pascal, which requires 48K bytes of continuous random-access memory. It can run on Apple Computer, Inc., North Star Computers, Inc., Terak Corp. and Digital Equipment Corp. PDP-11 small computer systems.

Several data bases are available for Dart, including Ram I, Ram II, Cue, SAM and LRN, which were developed by H.J. Hansen. Supplied with Dart is Dart/Basic for manual machine tool operations or light assembly. A user's data base also may be put into Dart.

An automatic maintenance activity log is part of the Dart system. It tracks and records changes made in standard data files and in time standards.

The vendor is located at 1495 Oakwood, Des Plaines, Ill. 60016.

ISR Offers Generator For PDP-11s

CORAOPOLIS, Pa. — Information and Systems Research, Inc. (ISR) here announced the commercial availability of Rims/MPG Customer Oriented Output Producer (Co-Op), a report program generator for RT-11 and RSTS/E based computer systems which run on Digital Equipment Corp. PDP/11 equipment and utilize Dibol/DBL, Basic-Plus or Cobol-11/Cobol-Plus languages.

Rims/MPG Co-Op consists of the Reports, Sort and Dictionary modules of Rims/MPG. Users can create custom-designed reports that are either manually or automatically formatted. They also can incorporate summary tables, text breaks, accrual tables and syntax-analyzed computation capabilities into the final report, the vendor said.

Rims/MPG Co-Op is reportedly able to retain the report programs it creates. The program can be saved and employed repeatedly as the data itself changes.

Rims/MPG Co-Op is available to OEM/Distributors for a license fee of $3,750. Its one-time price to an end-user is $2,500. Both fees are exclusive of media. The vendor is located at 410 Rouser Road, Coraopolis, Pa. 15108.

Spar Enhances Jobshop System

ANNAPOLIS, Md. — Spar Asssociates, Inc. announced that Release 2 of Jobshop, its shop loading system using a deterministic algorithm, will be available later this year.

Jobshop can schedule work items as small as six minutes in duration and is designed for manufacturing and construction appplications, the vendor said.

The upcoming release will feature multishop and cross-shop scheduling, optional report formats for military applications and enhanced select and sort options.

Written in Ansi Fortran, Jobshop is priced at about $25,000 from Spar Associates, Inc., 20 S. Cherry Grove Ave., Annapolis, Md. 21401.

Telesoft Introduces Ada Compiler

NEW YORK — A new compiler for the Department of Defense's (DOD) Ada high-level programming language has been introduced here by Telesoft, Inc., the company resulting from a recent merger between two San Diego-based companies, Renaissance Systems, Inc. and Telesoftware, Inc.

Called Telesoft-Ada, the compiler is a portable implementation of the standard Ada language with no extensions. The initial release of the compiler, which will run on the Motorola, Inc. 68000 processor, performs full Ada syntax checking and is capable of producing code for most of the features of the Ada language, the company stated.

All programs written in Telesoft-Ada will compile correctly on a compiler fulfilling the validation requirements of the DOD for Ada, Telesoft noted.

Syntax Checker

The company said that its product is a large enough partial implementation to be useful for systems programming and features a syntax checker which can analyze the entire Ada language.

Telesoft offers its compiler with code generated for the following data types: integer, float, array, record, access, enumeration, private, identifier overloading and separate compilation. It also offers predefined language attributes as size, first, last, pos, val, pred, succ, length, range, digits, mantissa, emax, small, large and epsilon.

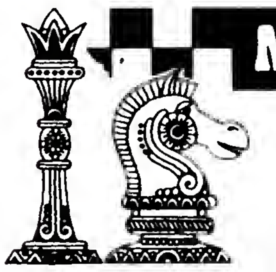
Code is not generated for abort statements, generic packages, subunits, library task families and conditonal and timed entry calls. In addition, blocks may not have exception handlers, Telesoft said.

Other language features that have not been fully implemented will be available in the future, according to the company.

Within the execution environment, the Telesoft-Ada compiler generates an intermediate p-code file which, according to Telesoft, is suitable for running interpretively. Native code translators will also be available to generate code for various 16- and 32-bit processors, the company added.

President of Telesoft, Peter Dine, revealed that the company plans to market the compiler to beta-test customers this June and claimed that "with the DOD supporting Ada, there's no way the world won't be using it." He added that the company also plans to market its product in Europe where, according to Dine, 40% of the total Ada market exists.

The Telesoft-Ada compiler licensing fee in a single CPU environment will be about $2,000 from Telesoft, 10639 Roselle St., San Diego, Calif. 92121.



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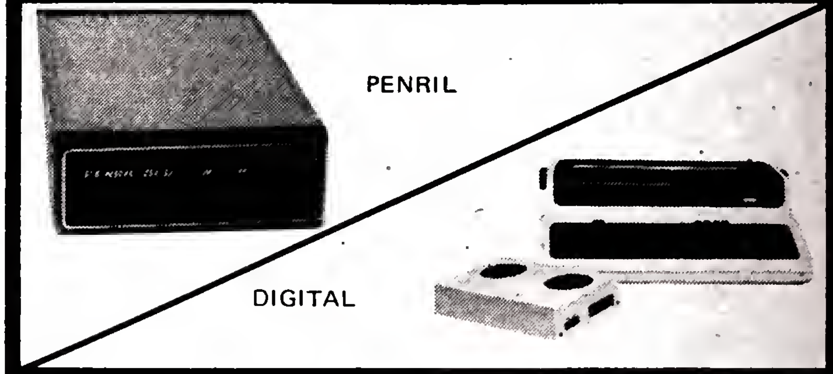

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'Seed' Codasyl-Type DBMS Runs on HP 3000 With MPE

PHILADELPHIA — The Seed data base management system (DBMS) is now operational on the Hewlett-Packard Co. HP 3000 computer with the MPE operating system, International Data Base Systems, Inc. announced here.

This offers HP 3000 users a Codasyl-type DBMS that provides a relational interface to the data base. They also can take advantage of Seed's structural flexibility, which allows multiple levels of hierarchy and extensive data networking.

Other Seed capabilities made available to HP 3000 users include the Harvest query language and the Bloom report writer. Harvest offers a Help facility, output directed to file or terminal and standard deviation and variance summary capabilities.

Bloom, a nonprocedural report writer, also was extended with defined variables as control items; exponentiation in defined variables; summary-only feature for reports; and standard deviation and variance summary capabilities.

Seed runs on a variety of hardware including Decsystem, Decsystem-20, and PDP-11; IBM 370, 30 series and 4300 series; Control Data Corp. 6000 and Cyber series; and Modular Computer Systems, Inc. Modcomp IV and Classic.

Seed supports both network and hierarchical data structures and permits data base access from either Fortran or Cobol. It is a Codasyl-type system written in a combination of Fortran and assembler, which costs $19,000. Its Harvest relational-like query language and Bloom nonprocedural report writer each cost $9,000.

International Data Base Systems is located at 2300 Walnut St., Philadelphia, Pa. 19103.

System for Manufacturers Uses HP's 'Image'

VIRGINIA BEACH, Va. — A business application system designed to perform nonmanufacturing computing tasks for manufacturers and written in Cobol utilizing Hewlett-Packard Co.'s Image data base management system was announced here by Satellite Computing, Inc. (Satcom.)

The six modules of the package called Boss/3000 include order processing, inventory control, accounts receivable, accounts payable, general ledger and purchasing/receiving. Each module may be used as a stand-alone system or integrated with other Boss/3000 modules.

The order-processing module costs $19,500, and monthly software support costs $165. Inventory control is available for $13,000 and $110/mo for support. Accounts receivable cost $9,850 with an additional $80/mo for support.

Accounts payable is available for $10,175, and support costs $85 monthly. The price for the general-ledger module is $9,975, and support is an additional $85 a month. Purchasing/receiving is priced at $6,850, with $60/mo for support, the vendor said from 4530 Professional Circle, Virginia Beach, Va. 23455.

Upgrade Added To 'WP/3000'

LAGUNA NIGUEL, Calif. — An enhanced version of Bradford Business Systems, Inc.'s word processing software for the Hewlett-Packard Co. HP 3000 computer system has been announced by the firm.

Claimed to be "more of an office management system than just a word processing package," WP/3000 is said to offer electronic mail, mass mailing routines, file maintenance, file and document cataloging, report writing and utility functions.

As a word processor, the package makes use of any of the HP family of block mode terminals and allows full use of the features of these terminals, including the HP 2626, HP 2624 and the HP 2642, the vendor said .

Text is entered in a block mode environment and the system is completely menu driven. WP/3000 reportedly offers a built-in help facility, user-definable default conditions, multiple printer support, multiple work stations, file security, document cataloging, user entry time reporting and expanded file names.

The package sells for $6,000 with a $500 discount for prompt payment and is available now from Bradford Business Systems, Inc., 24991 La Vida Drive, Laguna Niguel, Calif. 92677.

Graphics Offered For Daisywheel Units

ATLANTA — A graphics package said to generate line, bar and circle graphs for daisywheel printers has been announced by Escape, Ltd.

The Daisywheel Plotting System consists of 60 user-callable Fortran routines with other routines included to provide the basic plotting functions necessary to develop specific applications. The system is priced at $600 from Escape, Ltd., P.O. Box 18797, Atlanta, Ga. 30326.

Worried about wasted time converting from one tape code to another?

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How did it happen, you might well ask, that the creators of punched-tape codes failed to anticipate the fact that people like you might get annoyed that some codes use eight holes and others only five?

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'G/L Plus' Extended To Run on Prime 750

NEEDHAM HEIGHTS, Mass. — McCormack & Dodge Corp. announced that the Prime Computer, Inc. Model 750 hardware is now compatible with the G/L Plus general ledger/financial analysis system software package.

Written in ANS Cobol, the G/L Plus system is also compatible with the IBM 360, 370, 30 series, System/34 and 4300; the Burroughs Corp. medium- and large-scale CPUs; the Honeywell, Inc. Level 62, 64 and 66; and the Hewlett-Packard Co. 3000, according to the vendor spokesman.

The G/L Plus is priced at $29,500.

McCormack & Dodge Corp. is headquartered at 560 Hillside Ave., Needham Heights, Mass. 02194.

Data Base-Oriented

System 80 Gains Order Entry

BLUE BELL, Pa. — Sperry Univac has introduced an interactive data base-oriented order entry system for its System 80 computer.

Order Entry 80 is said to meet the needs of small and medium-sized manufacturing companies that initially want a stand-alone system. Users can later integrate the system with a production and inventory control system such as Unis 80 with no modification required, the vendor said.

A source-code version of the system, called Order Entry 80E, also is available to allow users to customize the system to fit their specific requirements.

Order Entry 80 has capabilities for initial order entry and order validation. Designed for use by order entry personnel using visual display terminals, the system allows information to be entered and displayed on terminal screens in their working areas.

The system can handle information concerning customers and customer parts (with prices and terms), product and part information, inventory posting and status checking, customer order entry, generation of backorders and control, order retrieval, order picking and shipping and invoicing.

Users can maintain information concerning customers including customer number, name and address, order policies and credit data, multiple customer shipping addresses, customer item data such as parts used by a particular customer showing discounts and price breaks.

Products and Parts

Product and part information in the data base can include numbers and descriptions, inventory policies for ordering (lot sizes), cost and selling prices, inventory data (on-hand and on-order quantities) and inventory locations.

Order Entry 80 provides a series of interactive transactions to post events affecting inventory status. On-hand quantities of parts and scheduled receipts are kept current and available for inquiry during the order entry procedure.

The system handles the transactions involved in stock locations maintenance (to preassign one or multiple locations for any item), receipts, issues, transfers, physical counts, returns and scheduled receipts (purchase and work orders), a Univac spokesman said.

Orders can be entered at the terminal with automatic customer verification and inventory availability checking while entry is in progress.

The Order Entry 80 system is immediately available for a license fee of $362/mo. With the addition of the source code, the fee is $483/mo. The vendor can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

EPS Adds Option To 'FCS-EPS'

GLEN ELLYN, Ill. — EPS, Inc. is making an optional Hierarchical Consolidation Module available to expand the financial modeling power of its FCS-EPS system.

An FCS-EPS system is priced at $35,000.

EPS, Inc. is located at 8600 W. Bryn Mawr, Chicago, Ill. 60631.

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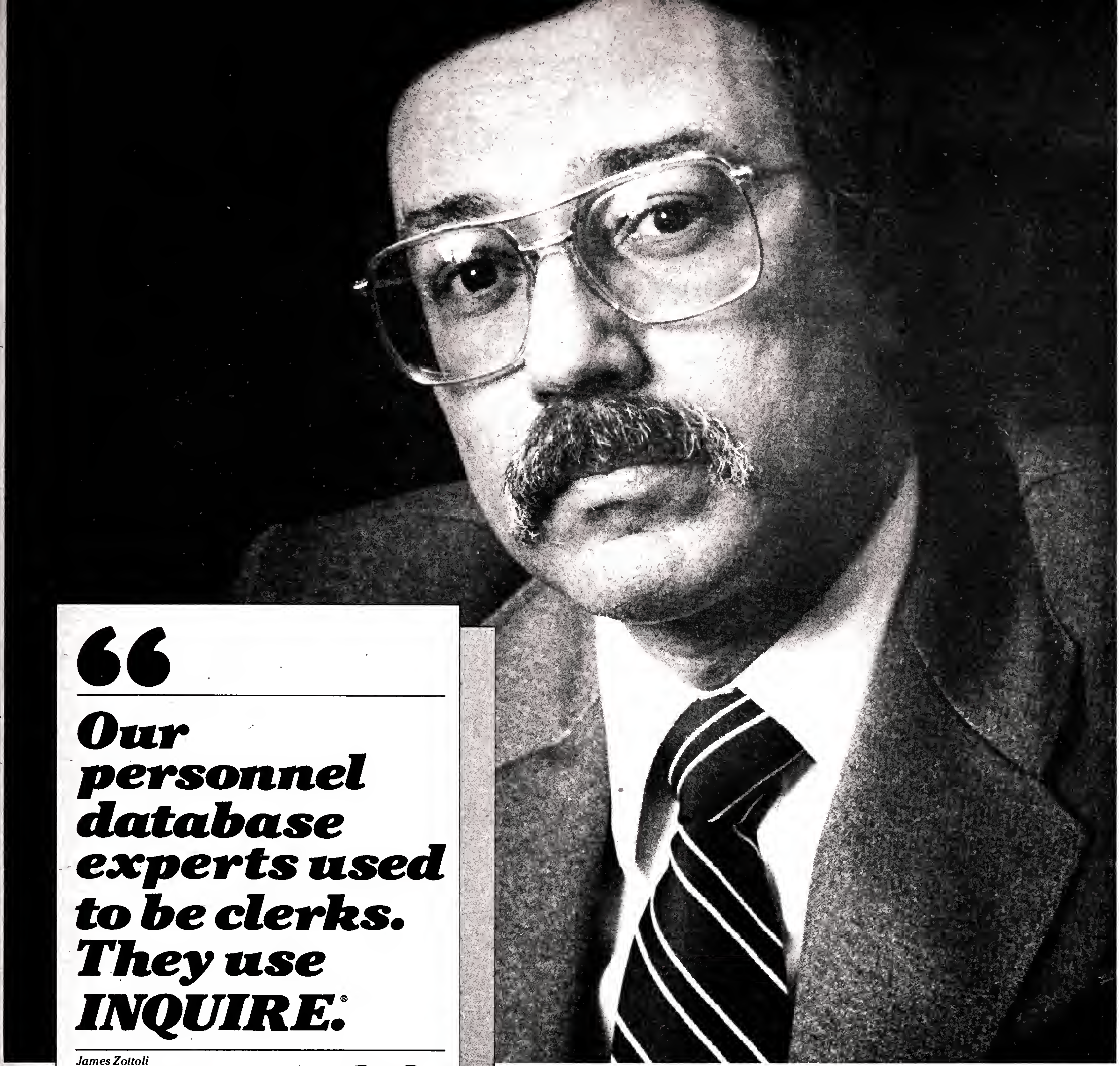

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Senior Systems Programmer
Corporate Computing Center

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Software Testing — Part 3

Software Tests Done Three Ways

	VISUAL CHECKING	RUN WITH TEST DATA	PARALLEL TEST
STATEMENT	APPROPRIATE USAGE, STANDARDS COMPLIANCE	NOT REQUIRED	NOT REQUIRED
ALGORITHM	CORRECT LOGIC, STANDARDS COMPLIANCE	(OPTIONAL) IF COMPLEXITY REQUIRES FOR QUALITY ASSURANCE	NOT REQUIRED
PROGRAM	READABILITY, 'CLEAN' LOGIC FLOW, STANDARDS COMPLIANCE	FUNCTIONALITY, PERFORMANCE	(OPTIONAL) MEETS USER REQUIREMENTS, COMPATIBILITY WITH SOFTWARE AT HIGHER LEVELS
JOB STEP	CORRECT SYNTAX, APPROPRIATE USAGE WITHIN JOBSTREAM	FUNCTIONALITY, PERFORMANCE	(OPTIONAL) COMPATIBILITY WITH SOFTWARE AT HIGHER LEVELS
JOBSTREAM	CORRECT SYNTAX, READABILITY, STANDARDS COMPLIANCE	FUNCTIONALITY, PERFORMANCE	MEETS USER REQUIREMENTS, COMPATIBILITY WITH OTHER SOFTWARE (INTERFACES)
APPLICATION	STANDARDS COMPLIANCE,	FUNCTIONALITY, PERFORMANCE	MEETS USER REQUIREMENTS, COMPATIBILITY WITH OTHER SOFTWARE (INTERFACES)
SYSTEM	STANDARDS COMPLIANCE	FUNCTIONALITY, PERFORMANCE	(IF RESOURCES PERMIT) MEETS USER REQUIREMENTS, COMPATIBILITY WITH OTHER SYSTEMS (INTERFACES)

Software Testing Requirements

By A. F. Grilz
Special to CW

Software can be tested in three ways: first, by visually "playing computer" and tracing the data flow manually; second, by utilizing the computer to run the software with test data; and, last, by executing a parallel test.

Visual testing involves checking for correct syntax, compliance with standards and appropriate software usage.

If one is using test data, check for functionality of the software and adequate performance.

When running a parallel test, make certain that the software meets user requirements and is compatible with other software if an interface is necessary.

At lower software levels, visual checking may be sufficient, but computer testing and parallel testing are required at higher levels. If the software is to be executed by the user in production mode — in an on-line environment, for example — the user should perform parallel testing under DP guidance. This allows the technician to evaluate the software under realistic conditions and gives the user the opportunity to assess the functionality of the software while he gains experience with both software and hardware.

In the final part of this three-part series, systems analyst Grilz outlines three methods for testing the various software levels.

Do not limit user testing to a one-time shot. Allow enough time for the user to expose the software to a wide variety of valid, invalid, normal and unusual conditions.

Statements are the lowest and least complex software level and are the easiest to test and debug. The compiler will catch any syntax errors that are not corrected during the visual check, so all that is left is to assure that the statement is appropriate for the action desired. Visual checking is sufficient at this level.

Algorithms can be tested in two ways. If the algorithm is simple, visual checking will normally suffice, but if it is complex, computer testing with test data is recommended. If the algorithm executes external routings, computer testing is necessary regardless of the complexity level.

Programs are tested under much the same criteria as algorithms or modules. Simple programs can first be tested visually, but should ultimately be tested on the computer. Visual testing reduces the drain on computer resources for finding basic errors like not opening and closing the correct files for the job or mismatches between data and variable fields. However, all programs should be subjected to computer testing before final acceptance.

Job Steps

Job steps should be checked visually for syntax errors and then executed on the computer to test performance and functionality. Parallel testing is optional.

Jobstreams are tested in the same way as the job step with the addition of parallel testing. Besides the visual test and computer run with test data, the jobstream should be run at least once in concurrence with the current production jobstream in order to check for run compatibility. This allows the tester to directly compare the results of the test run with the results of the production run.

Depending upon the application complexity, this phase of testing can be extremely time-consuming. But, if the software changes warrant application testing, the time spent is worthwhile.

Application testing is performed by running all affected jobstreams within the application with both test data and in parallel with production runs. As one progresses up through software levels, the testing becomes more complicated and takes up more time, but the effects of production

(Continued on Page 84)

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Language Processor, Program

Z8000 Gets Real-Time Multitasking

CUPERTINO, Calif. — A software package said to extend the capabilities of the 16-bit Z8000 microprocessor so that it can manage real-time, multitasking applications via easy-to-use commands has been introduced by Zilog, Inc.

ZRTS 8000 is a set of modular software components that reportedly permit fast, efficient implementation of customized operating systems for Zilog's Z8001 (segmented) and Z8002 (nonsegmented) CPUs, as well as future Zilog microprocessors.

The package consists of a small real-time, multitasking executive program called Kernel and a language processor called the System Configurator. Kernel manages all major real-time functions and requires 4K bytes of either programmable read-only memory (Prom) or random-access memory.

The System Configurator allows the various components of the target system — hardware information, software parameters, linkage information and system data structures — to be defined in high-level terms via the ZRTS Configuration Language (ZCL).

ZRTS 8000 will be available in mid-June for both the Z8001 and Z8002 CPUs. The diskette price of $3,500 includes unlimited duplication rights. ZRTS Prom sets for use with Zilog development modules will be available for $300 each. Both versions require a software license.

Zilog is located at 10340 Bubb Road., Cupertino, Calif. 95014.

IMSL Library Adapted for PE

HOUSTON — IMSL, Inc. here now offers its mathematical and statistical Library to users of Perkin-Elmer Corp. 7/32, 8/32 and Series 3200 equipment.

The set of 495 Fortran subroutines that comprise the IMSL Library reportedly assist in the development of a variety of scientific and engineering problem-solving applications.

The subroutines are arranged in 17 chapters, covering topics such as analysis of variance, nonparametric statistics and linear programming.

The IMSL Library is available for $1,600 for a one-year lease, the vendor said from Sixth Floor, NBC Bldg., 7500 Bellaire Blvd., Houston, Texas 77036.

Software Tests Done Three Ways

(Continued from Page 82)

failures become correspondingly more serious and widespread

It is not often that a complete system requires testing, but when it does, it is best that nothing be left to chance. The system level is the highest and most complex. It can also do the most damage to a DP operation if a failure occurs. While it is not probable that all error possibilities can be tested for, the more disciplined the testing, the less chance for a serious failure.

And, since resource limitations may prohibit parallel testing of a complete system, it is extremely important that computer runs with test data are thorough and precise.

Test Plan

A software test plan should be established before actually conducting the test. This provides a tool for scheduling test time within a software project and a checklist from which to perform the test.

The test plan should answer the following questions:

- How much time should be allocated for testing?
- How will the testing be scheduled?
- Which levels of software require testing?
- Which types of testing should be used at each level?
- Does the software being tested interface with other software? If so, identify it.
- Which user group should review the test results?
- Will the user be running the software in production? If so, which individuals should perform the user testing?
- What test results are necessary for a successful test?

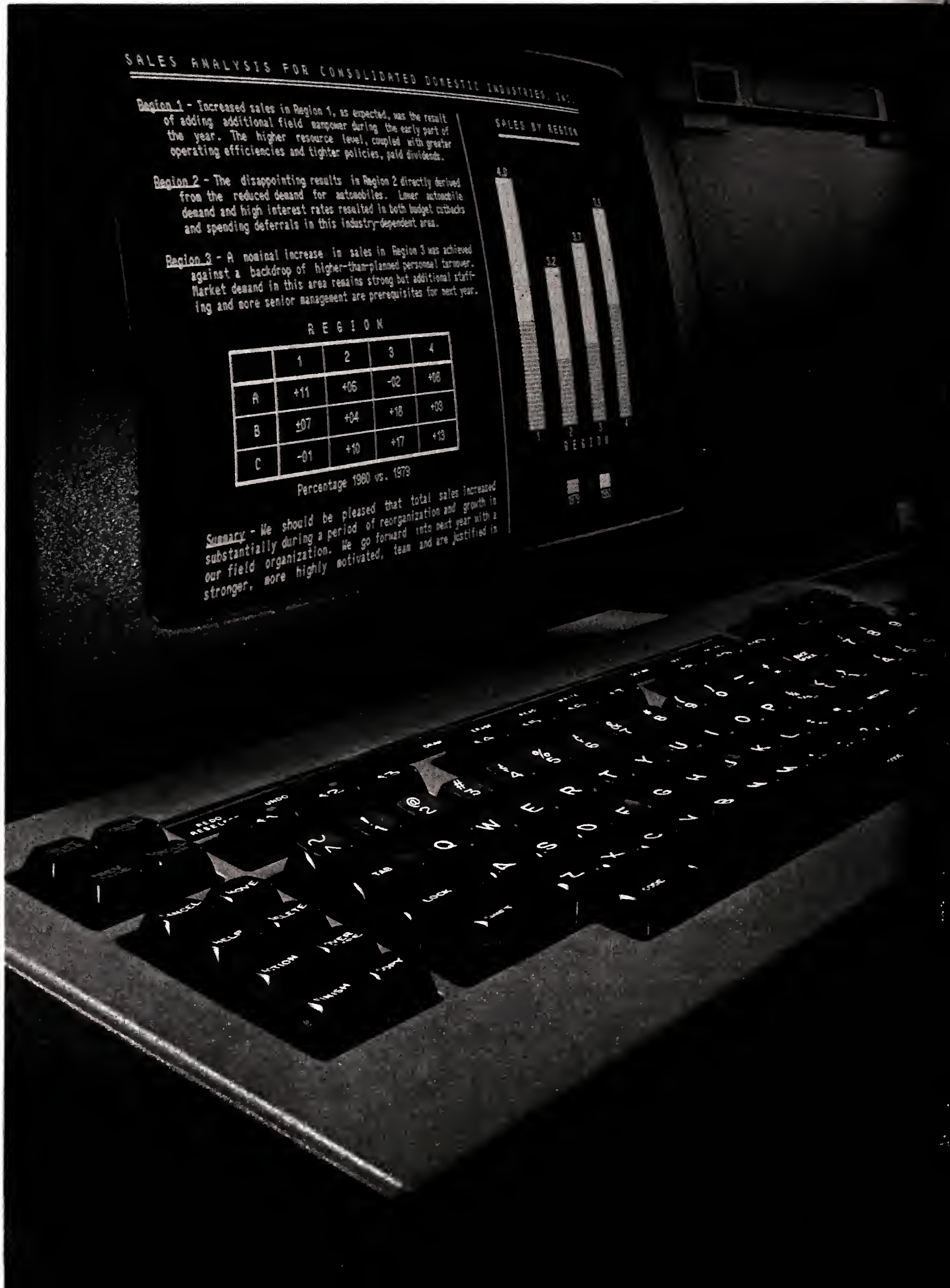
End-User Involvement

End-user involvement through the complete testing cycle cannot be overstressed. The user is a much better judge of the success of a test than the programmer or analyst.

Rely upon the user to verify results at each testing stage. During a large testing process, it may be necessary to set up a user acceptance sign-off for each testing stage. This helps DP and the user department to track the entire process.

Besides the value of user input during testing, working with the user helps him to feel involved in the software development and instills confidence that the reports he receives will meet his requirements. Nothing destroys user confidence faster than getting reports that do not provide accurate information.

Grilz is a systems analyst for Kroy Industries, Inc.



SALES ANALYSIS FOR CONSOLIDATED DOMESTIC INDUSTRIES, INC.

Region 1 - Increased sales in Region 1, as expected, was the result of adding additional field manpower during the early part of the year. The higher resource level, coupled with greater operating efficiencies and tighter policies, paid dividends.

Region 2 - The disappointing results in Region 2 directly derived from the reduced demand for automobiles. Lower automobile demand and high interest rates resulted in both budget cutbacks and spending deferrals in this industry-dependent area.

Region 3 - A nominal increase in sales in Region 3 was achieved against a backdrop of higher-than-planned personnel turnover. Market demand in this area remains strong but additional staffing and more senior management are prerequisites for next year.

REGION

	1	2	3	4
A	+11	+06	-02	+06
B	±07	+04	+18	+03
C	-01	+10	+17	+13

Percentage 1980 vs. 1979

Summary - We should be pleased that total sales increased substantially during a period of reorganization and growth in our field organization. We go forward into next year with a stronger, more highly motivated, team and are justified in

Graphics Option Offered To Support Tektronix 4110s

BEAVERTON, Ore. — To coincide with Tektronix, Inc.'s introduction of its 4110 series graphics terminals, the firm has announced a Graphics Segment Support Option to the Plot 10 Interactive Graphics Library.

The option was designed to support the segments features of the two 4110 series products — the 4112 and 4114 graphics terminals. Although intended to support the 4110 series products, the option reportedly is device independent and provides downward compatibility for many terminals that do not include local segment capabilities.

Graphics Segment Support matches the requirements of the 1979 Siggraph core proposal currently under review by Ansi, according to the vendor. Graphic segments are picture components that can be displayed and manipulated without affecting the rest of the picture data.

Graphics segments may include many vectors, panels, text and terminal commands that are generally subject to frequent revision or movement as a unit.

Licenses start at $3,000 from the firm, which may be reached through P.O. Box 500, Beaverton, Ore. 97077.

On-Line Application Tool Offered for Cincom's 'Total'

HOUSTON — An on-line application development and data base administration support system for Cincom Systems, Inc.'s Total is available from Datamart Systems and reportedly runs as a task under CICS/VS with basic mapping support.

Atom was designed primarily to enhance application development by eliminating the traditional problem of one project phase waiting for data from another project phase.

Atom provides functions that include field highlighting, searching by character strings or total element names, record displays, updating in character or hex, record creation and deletion and file or record copying within or across Total data bases.

It licenses for $5,500, the vendor said from 20939 Flaming Arrow, Crosby, Texas 77532.

File, Text Editor Enhance 'Triad'

KANSAS CITY, Mo. — United Computing Systems, Inc. here announced a file and text editor enhancement to its Codasyl-compliant data base management system (DBMS) Triad, which is available through its remote computing services network.

Uniedit, as the file and text editor is named, allows for modifications of data files, programs and textual material. With over 60 commands available, a user can add, change, delete, merge or modify the text in a data file.

Another\feature of Uniedit, the Text subsystem, provides specified line lengths, margin flush, tab sets, multiple headers, paragraph indentations, tabulations and page and chapter numbering to produce formal documents.

Pricing for access to the Uniedit enhancement is based on system resource utilization, the vendor said. It may be reached through P.O. Box 8551, Kansas City, Mo. 64114.

Datapoint 1550 Gains CP/M

NEW YORK — The addition of a CP/M operating system for the Datapoint Corp. 1550 small business microcomputer was announced here by Lifeboat Associates.

The operating system makes more than 200 other software programs immediately available for the Datapoint 1550 user, Lifeboat said. The software is supported by after-sales service, including a telephone hotline, an update service, documentation, patches and a subscription to "Lifelines," a newsletter that provides automatic notification of revisions.

Lifeboat reportedly supports 58 formats of microcomputer software and distributes 200 software programs for professional and business use. The CP/M operating system is priced at $350 for Datapoint 1550 models with 64K-byte memory and $800 for models with 96K-byte memory plus Cynthia 10M-byte disk drive.

The vendor is located at 1651 Third Ave., New York, N.Y. 10028.

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The multi-tasking operating system is specifically designed to be built upon, and supports five powerful languages (COBOL, FORTRAN, Pascal, BASIC, and Assembler), ISAM, sort/merge, and much more. Industry standard communications protocols include 3270, 2780, and 3780.

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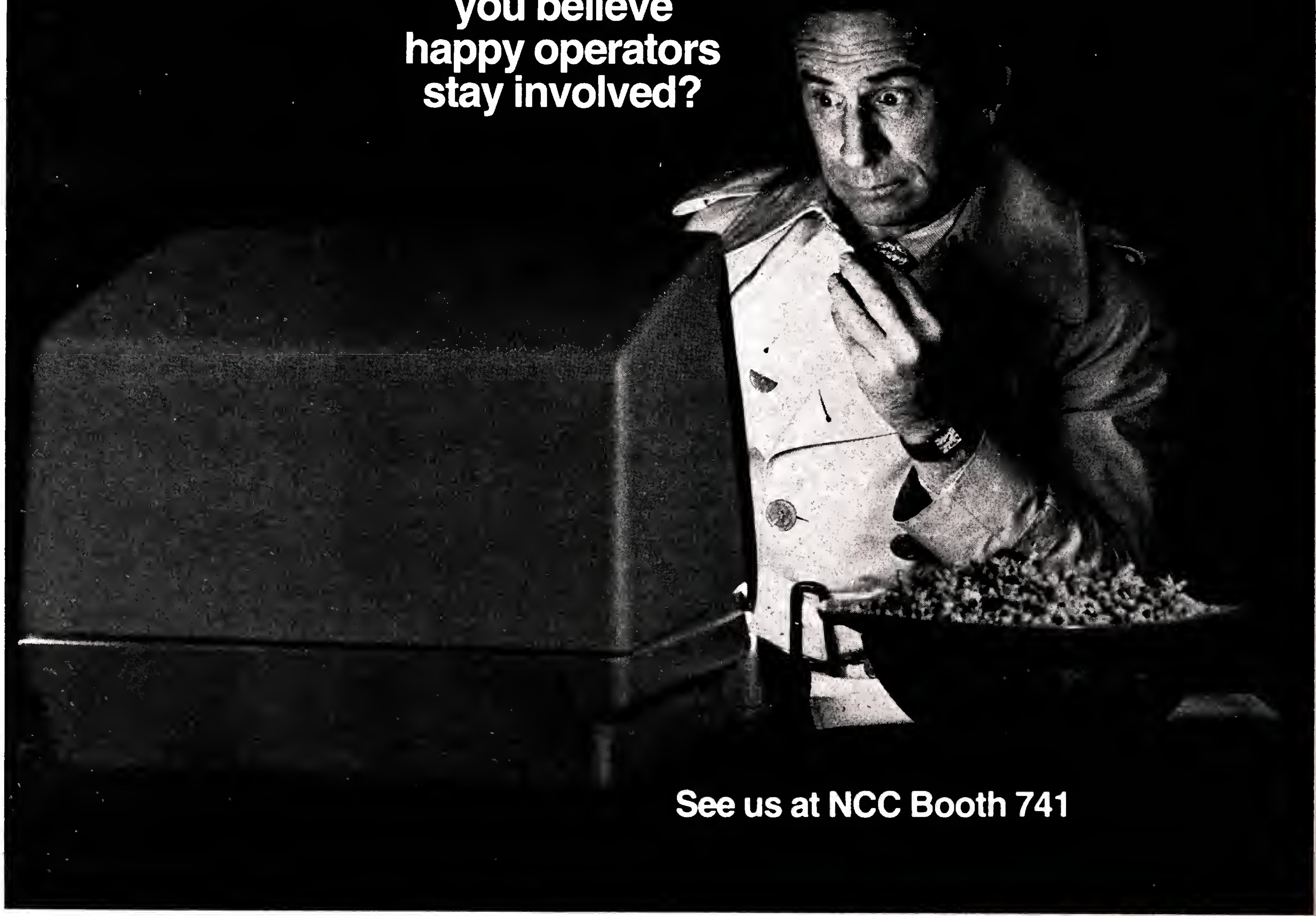

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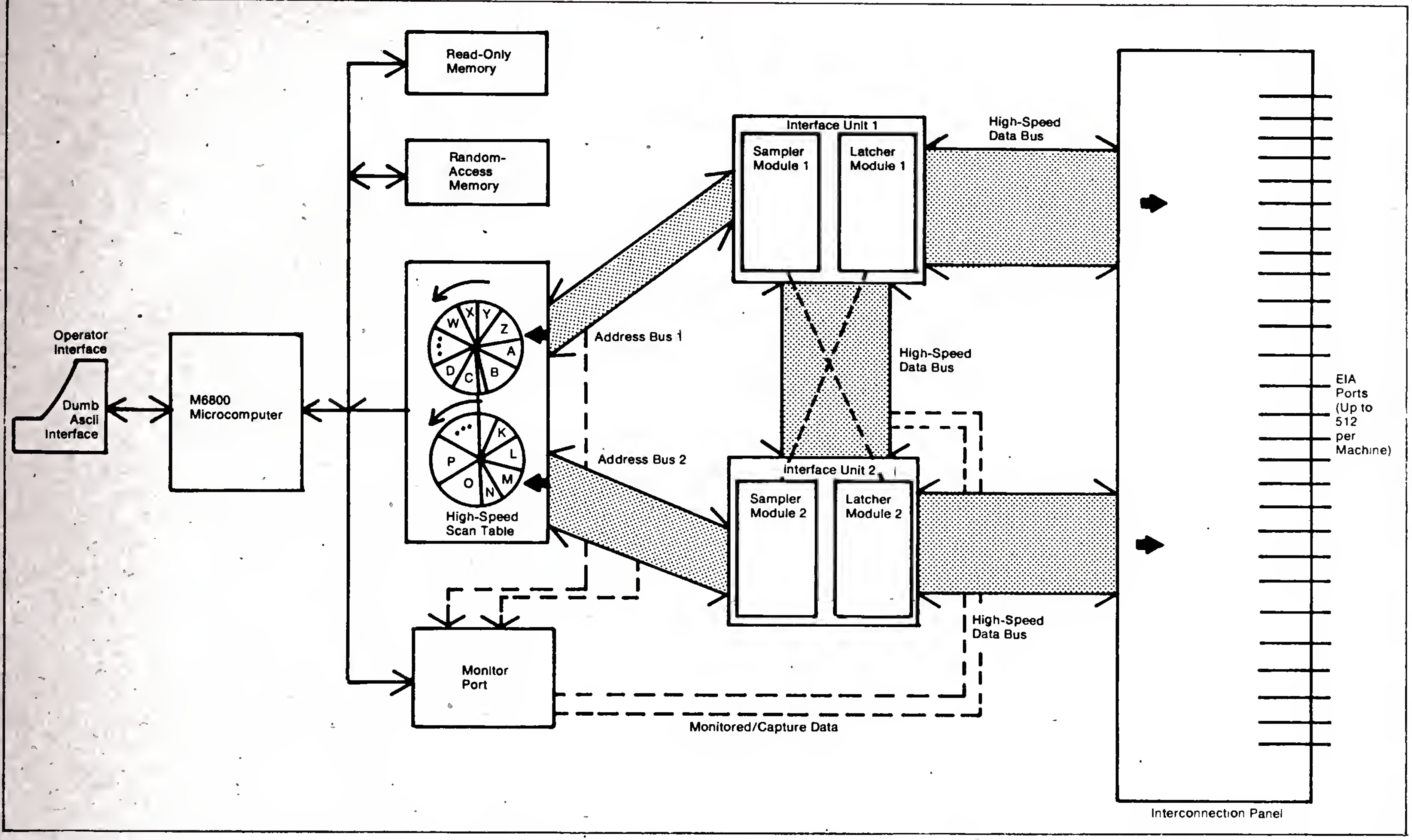

The block diagram above depicts, as an example of available intelligent electronic switches, the Intelligent Matrix Switch from Codex Corp.

The two interface units and the multiplexed high-speed data buses provide a programmable matrix of full-duplex interconnection paths. After receiving an EIA port address on its associated address bus, the sampler module within each interface unit reads the input data from that EIA port and then transfers it to the latcher module in the other interface unit.

The latcher module then writes this data into the EIA port at an address sent by the latcher module's associated address bus. Address pair sequences sent to the interface units are generated by the high-speed scan tables.

As these tables rotate, different address pairs are read and transmitted to the interface units along the address buses. The matrix of virtual interconnections among the EIA cables on the interconnection panel is determined by the arrangement of addresses in the scan tables.

Scan table programming is executed by the human operator via an integral M6800 microcomputer.

Electronic Switches — Part 1

Intelligent Switches Offer Unprecedented Control

By Gilbert M. Kaufman
And David G. Tolwinski
Special to CW

Intelligent electronic switches offer data communications users unprecedented scope of network control that does not require involvement in the complicated software of layered architectures.

This rather new product class meets the growing concern users have about overall network performance parameters. Users have become more interested in overall parameters because they consider the functionality and benefits of the total system more relevant than those of system parts such as modems, multiplexers and terminals.

Businesses want tools to control and manage important data communications investments. These tools could spell the difference between survival and extinction for both users and suppliers, since they are now considered necessary for productive implementation of sophisticated facilities.

This is the first half of a two-part series on intelligent electronic switches, which the authors see as a boon to performance evaluation of a user's full data network.

Network architectures and network control systems have appeared to provide such tools, forming a "glue" to bond resources together for a unified system with improved flexibility and adaptability.

Intelligent electronic switches are on

(Continued on Page 88)

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Switches Improve Scope of Network Control

(Continued from Page 87)

hand to compensate for certain shortcomings of present network architectures and control systems.

One shortcoming of current architectures is that various software layers contain management and control functionality in a way that allows the network to dynamically self-adjust to changing conditions without assurance that effective control is possible in certain failure scenarios.

FEP Failure

For example, if an FEP of IBM's Systems Network Architecture (SNA) or a major SNA node should fail or be isolated by line failure, the integrity of overall testing, diagnostic and control capability would be jeopardized and the data transport function disrupted. The complexity of layered network architectures would make human restoral and intervention procedures exceedingly difficult for many common failure scenarios.

Paradoxically, a layered network architecture's network control and management capabilities may depend on a properly functioning network.

Intelligent electronic switches improve network reliability, availability and flexibility.

For SNA-type networks, these devices can add an element of network control independent of the intricacies of the layered software, yet comprehensible to the human operator.

In conjunction with the independents' network control systems, electronic switches can extend the base of a user's control and intervention capabilities far beyond its pool of modems.

The following discussion, to be continued next week, will explain the advantages offered by electronic switches, using Codex Corp.'s Intelligent Matrix Switch (IMS) as an example of the switches now commercially available.

Conceptually, the operation of a typical electronic switch — which is based on an oversampling time division multiplexing technique — is surprisingly simple.

Figure 1 presents a simplified block diagram representative of the internal architecture of the Codex IMS.

Up to 512 network cables, compliant with Electronics Industries Association (EIA) interface standards, can be physically plugged into the EIA interconnection panel. For applications requiring more than 512 EIA cables, two or more IMS machines can be operated in tandem.

Reference to Figure 1 can help clarify switch operation. Address pair A-D is read from the high-speed scan table. Address A is transmitted to interface unit 1 and address D to interface unit 2.

Sampler 1 reads the EIA inputs from port address A and transfers this data to latcher 2, which writes this information into the EIA outputs of port D.

Sampler 2 reads EIA inputs from port D and transfers this data to latcher 1, which writes this information into the EIA outputs of port A.

The scan tables then rotate one position, and the process is repeated for two new address pairs.

Important Features

Other important features include programmable monitoring hardware, hierarchical control and communications capabilities and automatically activated redundancy.

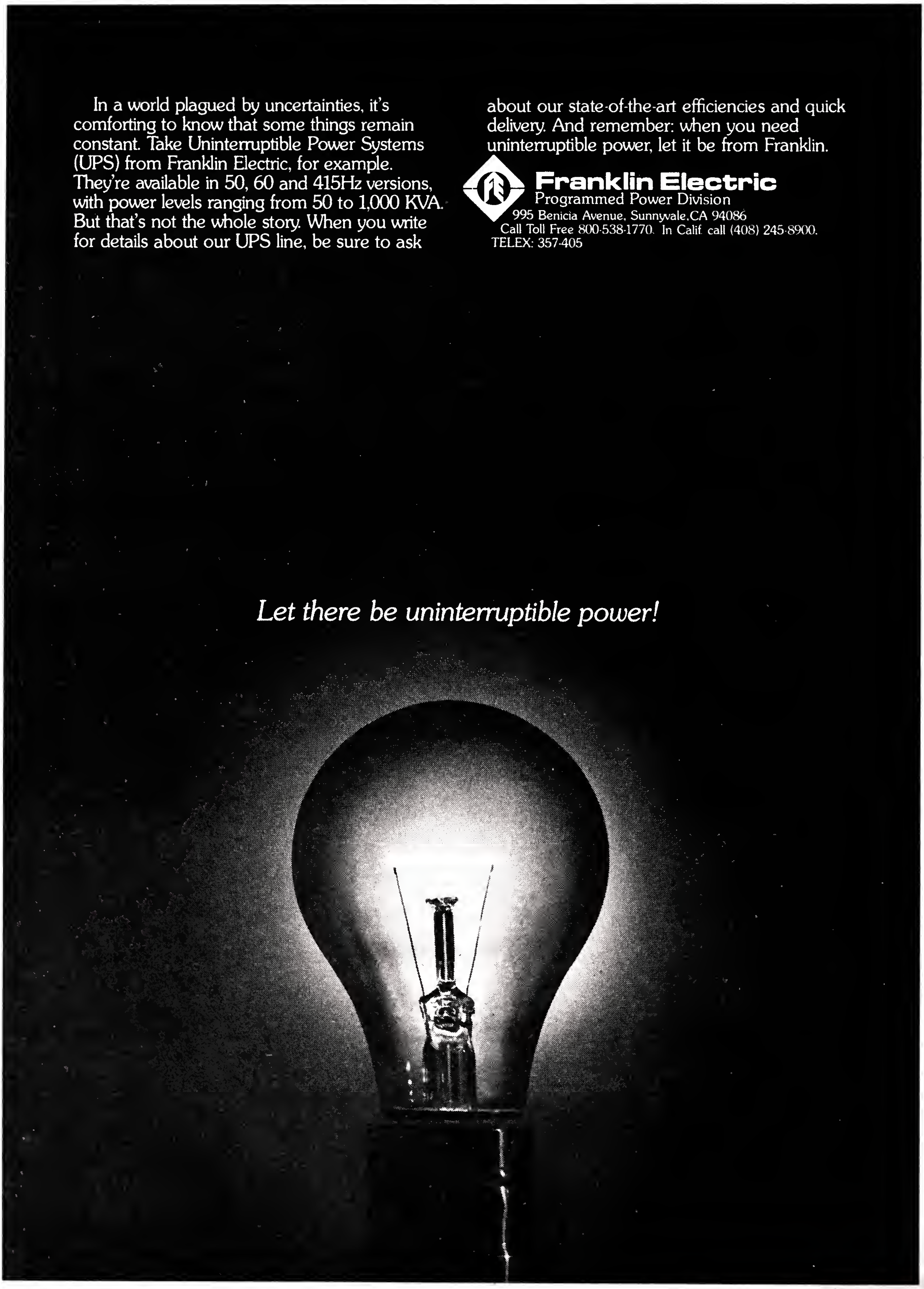
Monitor ports allow an operator to selectively examine and trap any data flowing through the matrix of virtual interconnections.

Hierarchical control and networking capability allows an operator to centrally control distributed switches.

Automatically activated redundancy provides an internal nondisruptive cutover to spare integral modules if an IMS equipment failure is sensed.

Next week, this two-part series will conclude with further explanation of why electronic switching has become necessary and how it is applied.

Kaufman and Tolwinski are engineers with Codex Corp., 20 Cabot Blvd., Mansfield, Mass. 02048.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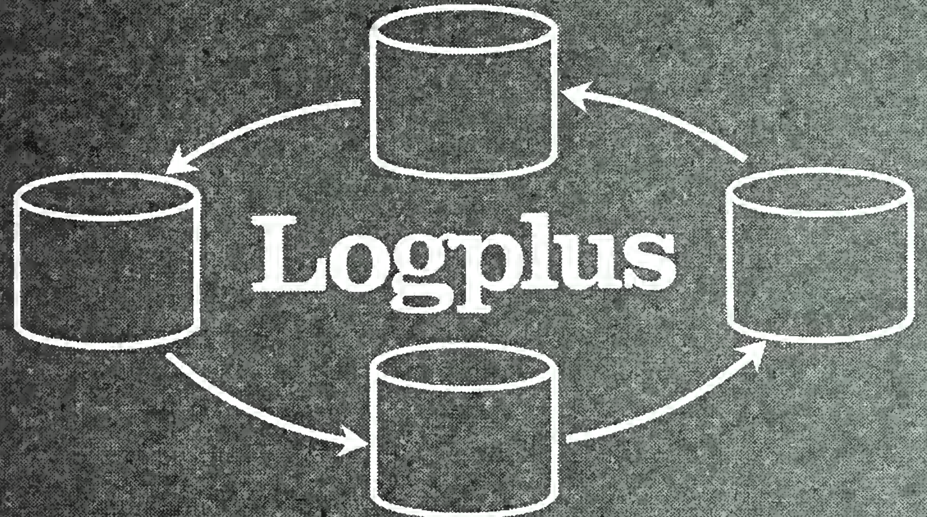

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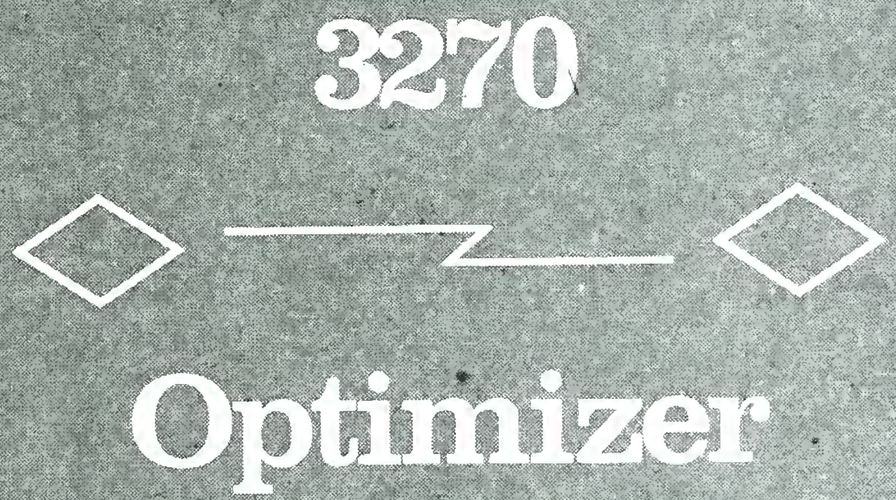

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Local Resource-Sharing Network Adds Control to Cluster Setups

LAS VEGAS — A local resource-sharing network that reportedly provides controlled sharing of a common data base for Convergent Technologies, Inc.'s family of desktop minicomputers is available from that vendor.

Cluster configurations allow several stations to share peripherals, but not processing.

Each station executes its own interactive application program, so that computational power and a high level of responsiveness are maintained as more stations are added to the cluster, the vendor claimed.

Master Station

Each cluster system consists of a master station that can run applications and provide resources to the individual workstations and up to 16 cluster stations, all connected via a high-speed data link, according to the vendor.

The data base of the master station is accessible to each cluster station, subject to password protection. In addition, each cluster station can have private files on an optional disk.

Access Range

Both stand-alone and cluster configurations have access to remote (distributed) data bases through long-haul networks that will in the future include X.25 and Systems Network Architecture, among others.

A typical four-station cluster system with 10M bytes of Winchester disk storage and 128K bytes of random-access memory at each workstation costs $39,800.

Convergent Technologies, Inc. is located at 2500 Augustine Drive, Santa Clara, Calif. 95051.

CRT Gives 19.2K Bit/Sec

ROCHESTER, N.Y. — Volker-Craig, Inc. has unveiled a CRT terminal with a built-in bidirectional serial printer port and 15 data rates up to 19.2K bit/sec.

The Chat terminal features switch-selectable compatibility with the Lear Siegler, Inc. ADM-3A and the vendor's VC404. Other standard features include a 12-in. black-and-white screen with an antiglare filter and a detached keyboard.

The product costs $645, Volker-Craig said from 333 Metro Park, Rochester, N.Y. 14623.

Rixon Brings Out Statistical Mux, Switch Option

SILVER SPRING, Md. — Rixon, Inc. has unveiled a statistical multiplexer designed to offer error-free transmission of up to 240 channels over as many as 12 composite links.

The DCX850 features a user switching option module, which provides user-selectable switching and port contention, network monitoring and statistics reporting, a spokesman said.

The user switching feature enables users at designated ports to connect their terminals to any other compatible port of their choice anywhere in the network.

The product costs $15,585, the vendor said from 2120 Industrial Parkway, Silver Spring, Md. 20907.

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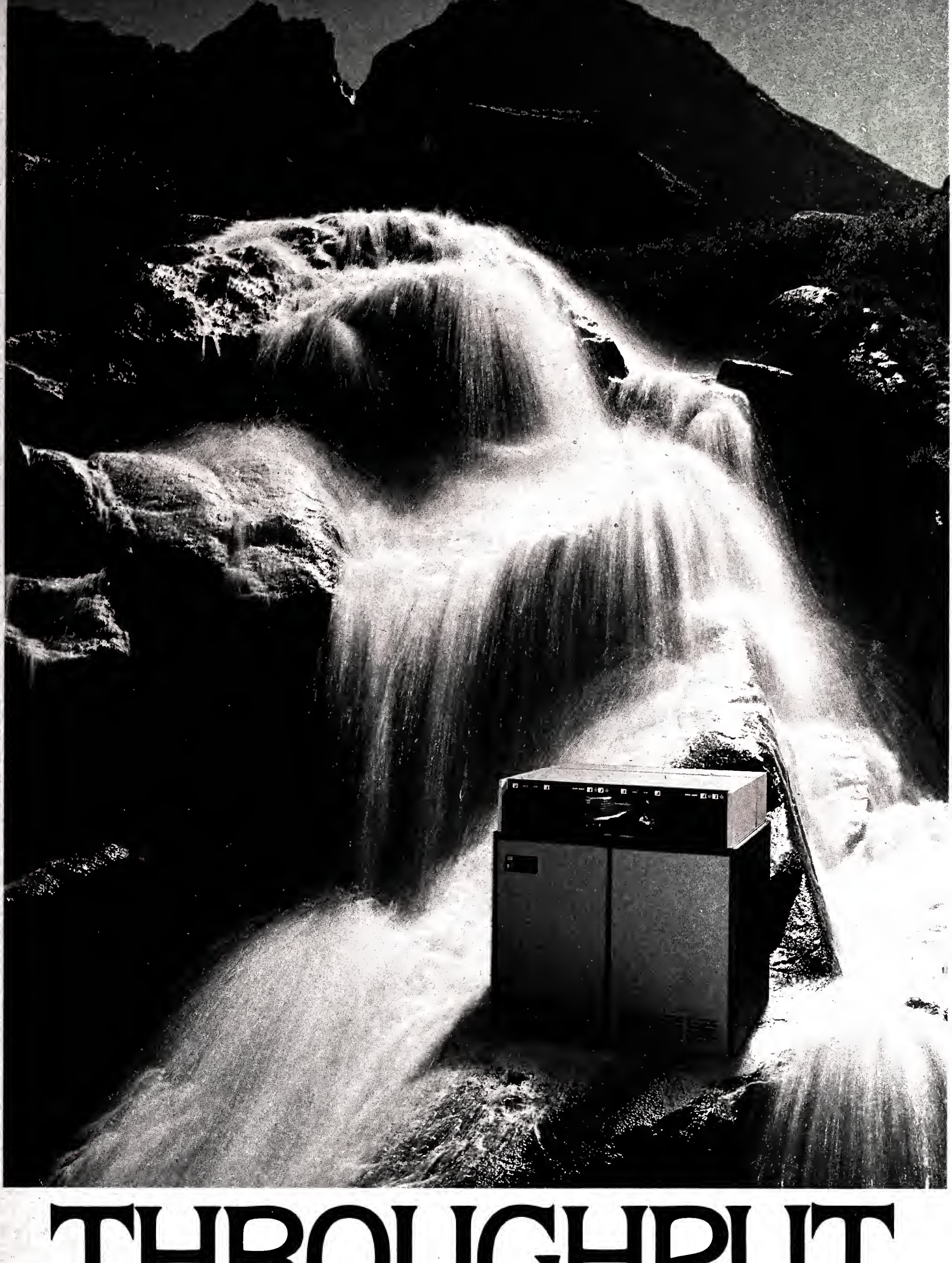

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FM Wideband Modem Suits Broadband Nets

MOUNTAIN VIEW, Calif. — A 450-MHz FM wideband modem designed for broadband networks is available from Catel.

The WFMS-3000 provides nearly transparent transmission of such signals as high-speed pulse code modulation multiplex data to 19M bit/sec, analog frequency division multiplexing (FDM) signals and broadcast-quality video.

The modem can also be configured to interface with analog fiber-optic links for multiple channel transmission on single fibers by FDM frequency modulation (FM) multiplexing.

Although primarily designed for the transmission of analog video signals, the modem also facilitates data transmission. The system features eight plug-in modules in one cabinet which make up a complete transmit/receive system for duplex audio and video.

Users can choose either frequency-synthesized input and output converters to cover 14 MHz to 450 MHz, or single-channel units for any frequency from 14 MHz to 4,590 MHz. The system can be operated on either ac or dc power.

The system costs $8,500 for a complete two-way channel, Catel said from 1400-D Stierlin Road, Mountain View, Calif. 94043.

Interface Unit Fits Coax Nets

BOHEMIA, N.Y. — Amdax Corp. has unveiled a data exchange interface unit designed for high-performance synchronous or asynchronous communications within the vendor's data exchange network.

Designed for use with broadband coaxial cable networks that integrate data with voice and video channels, the DAX 746 runs at up to 19.2K bit/sec as the interface between the user's terminal equipment and the network itself.

The unit accepts information from the user's device in digital form and superimposes it onto a radio frequency signal transmitted along the cable. It costs $950 from Amdax, 160 Wilbur Place, Bohemia, N.Y. 11716.

Display Added To 290 Series

MINNEAPOLIS — Northern Telecom, Inc. has added a 3,564-char. screen display to its Model 290 series of terminals.

The enhancement to the IBM 3270-compatible Northern Telecom Model 294C will allow programmers and operators to view an entire computer printout "page" on the CRT terminal screen, a spokesman said.

The Systems Network Architecture (SNA)-compatible 294C controller supports up to 32 display stations and/or printers in a remote cluster environment, the vendor spokesman claimed.

The system now offers four display screen sizes: 1,920-, 2,560-, 3,440- and 3,564-char.

A typical Model 294C configuration with four Model 298-5 display stations costs $22,755, the vendor said from Data Park, Box 1222, Minneapolis, Minn. 55440.

Informer 304 Runs With DEC, NCR, DG, Univac, Other CPUs

LOS ANGELES — Informer, Inc. has announced that its Model 304 terminal is now compatible with computers made by Digital Equipment Corp., NCR Corp., Honeywell, Inc., Sperry Univac, Microdata Corp., Datapoint Corp. and Data General Corp.

The 304 terminal utilizes a 128-character set with lowercase descenders and comes with a standard 9-in. screen and a data mode monitor for communications testing, the vendor said.

The 304 is priced at $2,295 from Informer, Inc., P.O. Box 91054, Los Angeles, Calif. 90009.

Entry-Level Terminal Has Nonglare CRT, Detached Keyboard

SALT LAKE CITY, Utah — An entry level terminal featuring a detached, intelligent keyboard with edit functions, block and character transmission, split screen, nonglare CRT and a programmable status line is available from Beehive International, Inc.

The DM5 also has a 12-key numeric pad, 16 program function keys, an auxiliary printer port with flow control and X-on, X-off flow control, a spokesman noted.

It costs $880 from Beehive at 4910 Amelia Earhart Drive, Box 25668, Salt Lake City, Utah 84125.

Datamedia Terminal Emulates DEC VT100

PENNSAUKEN, N.J. — A CRT terminal designed to emulate the Digital Equipment Corp. VT100 is available from Datamedia Corp.

The DT80/2 is targeted at users who do not need advanced video or expanded printer port options, a spokesman explained.

A 12-in. model costs $1,495 and a 14-in. model sells for $1,640.

Datamedia is at 7401 Central Highway, Pennsauken, N.J. 08109.

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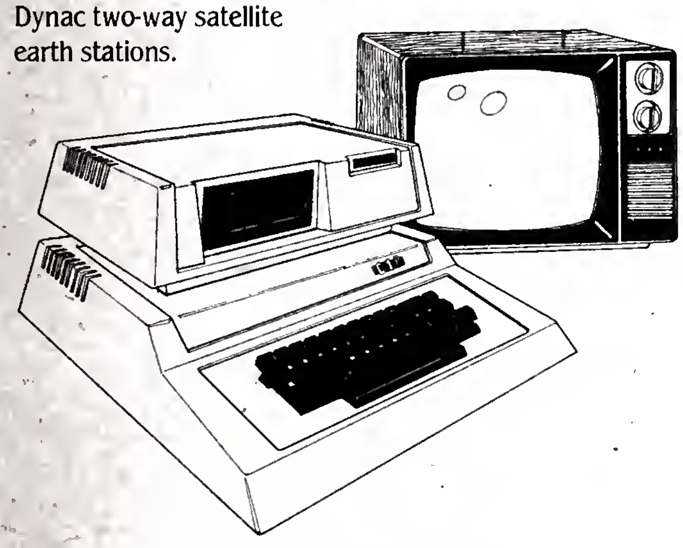
IBS-NET™ places small economical state-of-the-art processors at each user's work station. Several work stations are clustered around a data base processor which provides large fast access file storage and sharable resources such as word processing printers and remote communications channels. Several clusters can be networked together and/or tied to existing computer facilities. Local communications are handled by low cost, high speed cable links and remote communications can be handled by a broad range of M/A-COM communications technologies including cable, fiber, microwave and Dynac two-way satellite earth stations.



End User Benefits

Using standard IBS-NET™ hardware and software, a small to medium sized office can be equipped with personalized work stations which have the following capabilities:

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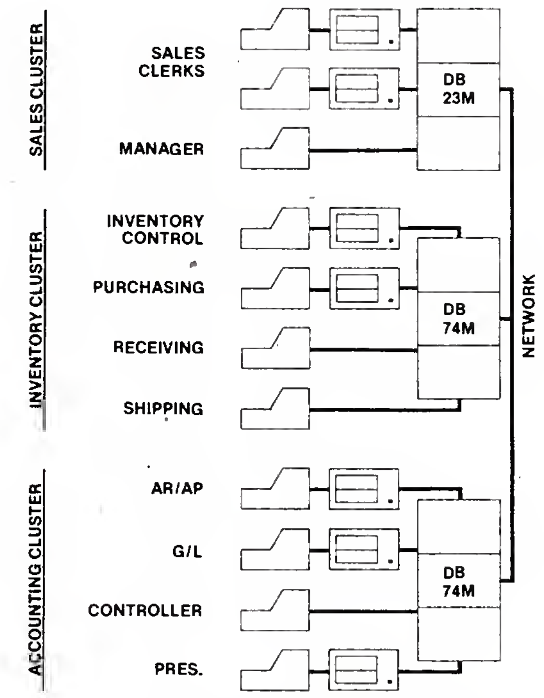
Stand Alone Operation Capability

Managers utilize the electronic mail, modeling and planning and general information retrieval features of the data base manager (which can access accounting and operations information).

Secretaries utilize word processing, electronic mail and information retrieval.

Staff and operations personnel make use of the "standard" accounting and operations modules as well as the word processing and communications features.

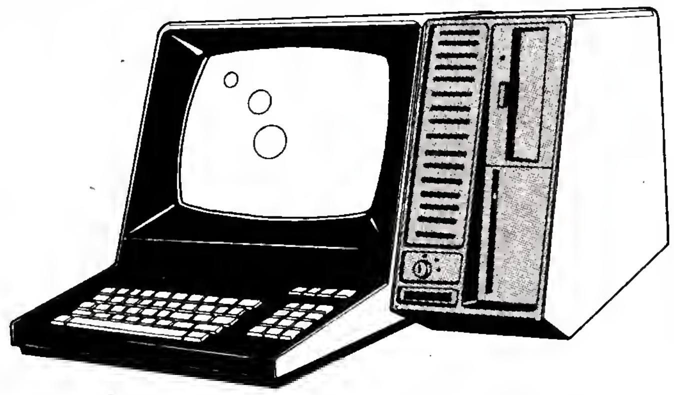
IBS-NET™ provides "total capability" to the small office that does not have established EDP capability. It can provide an extremely capable and cost effective "Intelligent terminal front end" with intrinsic word processing, electronic mail and general data communications capability to larger companies which have existing accounting and operations computer capability. IBS-NET's™ local small office capabilities married with M/A-COM's data communications expertise can yield extremely effective results for branch offices of larger corporations.



Versatility & Expandability

Work stations — Ohio Scientific offers a broad range of work stations ranging from ultra low cost "personal type" desk top computers through several medium priced integrated intelligent terminal models to a 32 bit processor based system with a local 5" hard disk.

Data Bases — Ohio Scientific's popular field-proven Challenger hard disk computers with 14" Winchester hard disks are the "core" of the data bases. Current models provide 37 or 74 megabytes of usable data base storage. Hard disk backup is via the network and/or tape cartridge or IBM compatible 1600 BPI mag tape [1]. The Challenger's unique multi-microcomputer architecture allows it to run Ohio Scientific's ultra high performance 65U operating system via its internal 6502 or the C/PM and MPM [2] operating system via its internal Z-80. A new CPU expander card adds either or both the 16 bit Z-8000 and 32 bit 68000 processors which execute UNIX [3] and other mini-maxi operating systems.



Upward Expandability

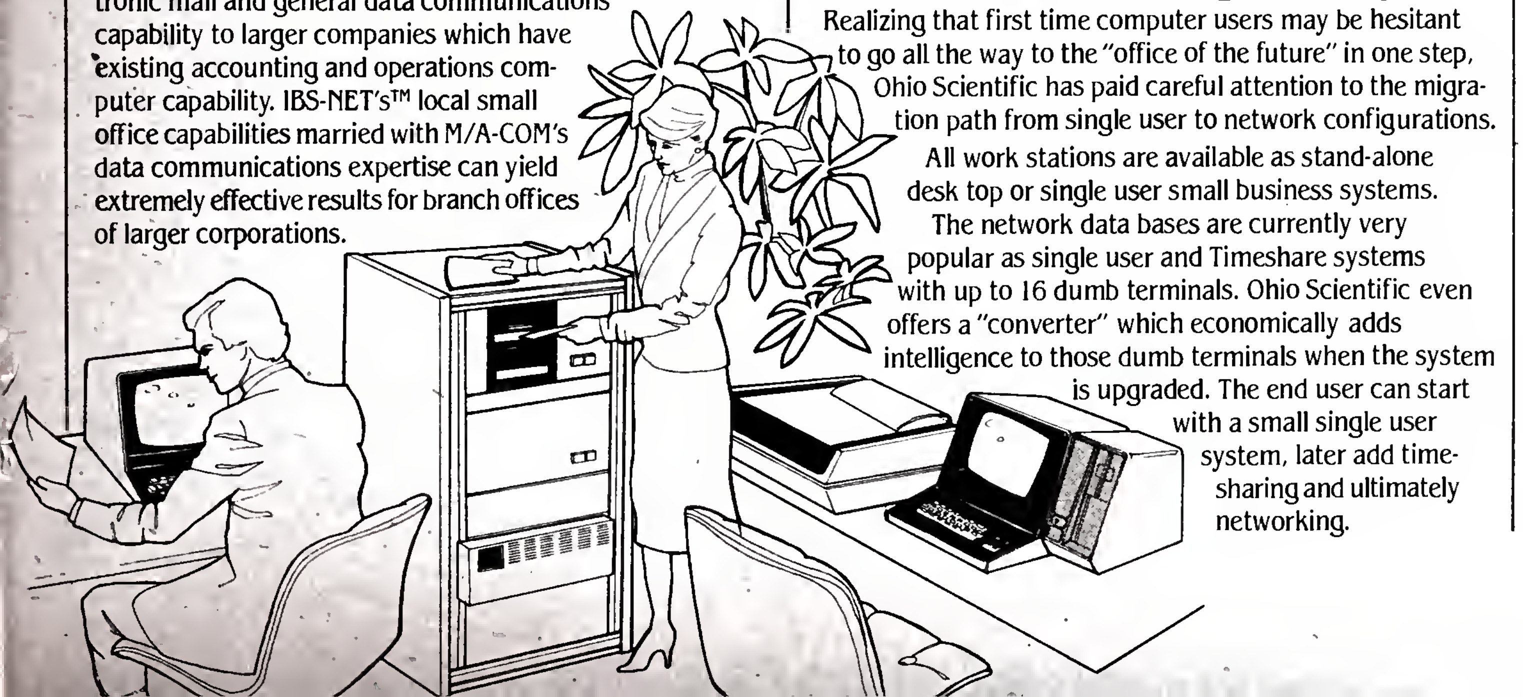
Up to 16 work stations can be clustered around a central data base and several data bases can be connected locally, all using very inexpensive high speed cable links. Remote links via several protocols give the system virtually unlimited interconnect capability.

Downward Compatibility

Realizing that first time computer users may be hesitant to go all the way to the "office of the future" in one step, Ohio Scientific has paid careful attention to the migration path from single user to network configurations.

All work stations are available as stand-alone desk top or single user small business systems.

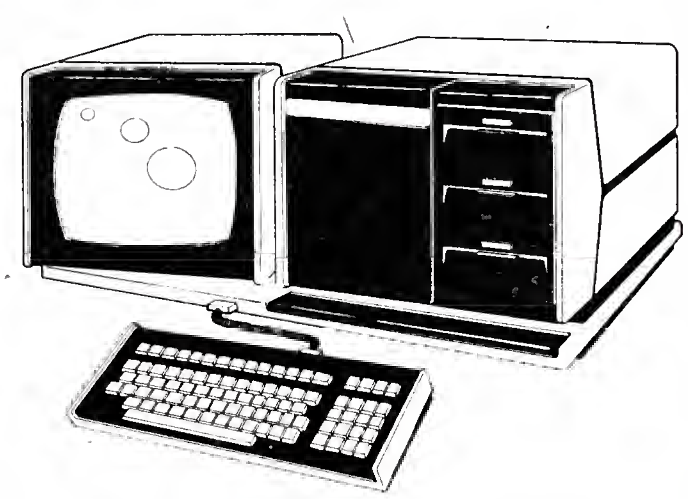
The network data bases are currently very popular as single user and Timeshare systems with up to 16 dumb terminals. Ohio Scientific even offers a "converter" which economically adds intelligence to those dumb terminals when the system is upgraded. The end user can start with a small single user system, later add timesharing and ultimately networking.



Software

The base operating system which provides the highest through-put is OS-65U, which is upward compatible from single user to timeshare to networking. OS-DMS-PLUS is the system's turnkey data base manager with optional network compatible modules including a word processor, DMS-Planner, an electronic mail system and a full set of basic accounting and operations modules including A/R-A/P, GL, Payroll, order entry and inventory. DMS-PLUS includes general entry, editing, arithmetic and report writing capabilities. It is compatible with Microsoft BASIC making it powerful and simple to use for software expansion and enhancement.

Suitably equipped work stations and data bases can also run C/PM (single user) and MPM [2] (multiuser), a popular microcomputer operating system, and Microsoft's XENIX [4] operating system for the Z-8000 which is a UNIX [3] compatible operating system enhanced for business applications.



Real? Or Futures?

Ohio Scientific has delivered hundreds of OS-65U Level 3 local networks in the last 2 years and tens of thousands of desk top, single user and hard disk based computers over the last 6 years.

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An End User's Guide To DATA BASE

By James Martin

Data base technology is becoming increasingly important to data processing. Much data processing will be built on top of data bases in the future, so the existence of appropriate data bases will be vital to the running of corporations and other bodies.

Not all data base systems have been a success. Many have failed to achieve the advantages that good data base operation should bring. It has become clear in surveying the disappointments and the success stories that *effective involvement of the end users is critical for success.* To achieve this involvement, there are certain things the users must understand about data base technology. It is a new world for them and can be a bewildering one because of the complexity and jargon. Often, end users understand neither the principles of data base nor their own essential role in data base evolution.

This book explains to users what they should know about data base and what rôle they should play in its design and evolution. It does so without using the jargon that makes data base technology appear complex. It is important that *all* end users comprehend the simple concepts that are described.

Excerpted from An End User's Guide to Data Base *by James Martin, copyright (c) 1981 Prentice-Hall, Inc., Englewood Cliffs, N.J. Reprinted by permission. For more information, contact Mark Bentley, Prentice-Hall, Inc., 200 Old Tappan Road, Old Tappan, N.J. 07675.*

Many users have fears about the introduction of data base systems. Their jobs will be changed by data base usage. They are stepping into a dark room and cannot see where they are going. The best way to overcome the fear is to throw some light. This is achieved partly by understanding the principles described in this book and partly by involvement in the data definition and design, as we will describe.

> *Making computers understandable and accessible to end users is a powerful trend in the industry. At the same time, data base technology is beginning to emerge from its dark hours of misapprehension and misapplication.*
>
> *In this thoughtful, highly readable book, James Martin explains why no one should fear data base implementation and how users can make it a more useful tool than anyone imagined.*

The term "end user" implies the ultimate user of a data base facility, that is, not an interim user such as a programmer who programs functions for the end users. Data base end users are a diverse cross section of humanity: accountants, engineers, administrative managers, civil servants, shop-floor foremen, department heads, budget controllers, professionals, actuaries, the president and his aides.

Any manager, planner or professional whose job will be changed in the future by data base systems should understand what is in this book and become involved.

What Is a Data Base?

A data base is a collection of data that is shared and used for multiple purposes.

Any one user does not perceive all of the types of data in the data base, but only those that are needed for his job. A user may perceive only one file of data. That file always has the same structure and appears simple, but in fact it is derived from a much more complex data structure. Other users see *different* files derived from the same data base.

A data base is thus not only shared by multiple users, but it is *perceived* differently by different users.

You might think of blind persons confronted with an elephant. One person touches its leg and perceives it as being like a tree trunk. One touches its tail and perceives it as being like a rope. Another touches its tusks, and so on. Similarly, different data base users have different views of the data.

Someone has to design the entire elephant. In doing so, he must make sure that he meets the diverse needs of many users. In other words, all relevant user views must be derivable from the data base.

Data base design is a complex task. Its technical aspects can be largely automated. If this is done, the most difficult part of the task is understanding the data needed by the users and representing it in the data base. This is made complicated by the fact that different users use different names for the same data item, and sometimes the same name for data items which are really different.

For computers to work correctly, a high degree of precision is needed in representing the data they use.

It is up to user departments to ensure that the data they need is truly represented in a corporation's data bases, correctly defined, appropriately organized and protected from harm or invalid use. The data base designer needs the user departments' help in understanding their data needs.

In Dickens' Days

It is pleasant, now that the world of computers has become so complex, to let one's imagination drift back to the days of Dickens. In those days data processing was done by a clerk with a quill pen who perched on a

(Continued on In Depth/2)

(Continued from In Depth/1)

high stool and perhaps wore a top hat. In front of him he had a set of thick and well-bound ledgers.

If an order were made for a certain quantity of goods, a clerk would deal with this transaction in its entirety. He might look at his stock sheets to see whether the order could be fulfilled from stock or whether some of it had to be manufactured. He would update the order book, and if any goods were sent, he would modify the stock sheets to make out a bill for the customer. Then he would make an entry on the appropriate page of a customer ledger — a simple process that was easy to understand.

If anyone had any query about the state of the business, about a certain item of stock or about an outstanding debt of a customer, the clerk could turn to the appropriate pages of his ledgers and immediately produce the answer. One can imagine such a clerk today taking orders by telephone and answering queries over the telephone. He would balance his books at the end of each day, and if costing figures were required, he could maintain them so that they were as up to date as required.

However, admirable as the methods of the Dickensian clerk were, they could work only in a fairly small company. As the company grew, the size of the ledgers increased until several clerks were needed to maintain them. Division of labor made the job easier, and one clerk would maintain the stock sheets while another did the billing and so forth.

Batch Work

Earlier in this century, various means for mechanization were introduced, and to make efficient use of them, the work was split up into batches. For example, several hundred transactions may have been grouped into a batch. One accounting function would be carried out on all the transactions by one clerk or one machine, and then the next function would be performed by another clerk or another machine.

When punched-card accounting was introduced, it became economical to have very large batches. Many trays of cards would be fed through one machine before the setup of that machine was changed for the next function it would perform. Similarly, with the use of magnetic tape on computers, large tape files would be processed with one program before the file was sorted and made ready for the operation.

In working this way, the flexibility of the old clerical methods was lost. It was no longer possible to give one transaction individual treatment. It was no longer possible to give quick answers to inquiries about the status of an account, the credit-worthiness of a customer or the amount of an item in stock. Or, at least, if such an inquiry was made, the answer might be a week or more out of date. When items were to be posted, it was necessary for the computer to read every item in the file as it scanned its way to the ones to be updated, and every item had often to be written out afresh on a new tape, whether it was updated or not.

Batch processing, with data rigidly divided into separate files for each application, was not the ideal way to operate. It would have been much more convenient for management to have all the information about running the organization up to date and at its fingertips. Because of the nature of DP techniques, management was living with a compromise. The compromise stayed in existence so long that it became the accepted method of operation, and little thought was given to its desirability.

The use of a data base is like having a superbly fast and brilliant Dickensian clerk who keeps data for many applications. He organizes his books so that minimum writing is necessary and so that he can search the books quickly to answer any queries that may come along. Unlike his pedestrian predecessors who could write or read items in only one ledger, he rushes from one set of data to another, gathering together separate items to respond to highly varied requests for information. He is a godsend to management.

Executives often need information that spans departments or spans traditional boundaries in the corporation, such as the engineering, ac-

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counting, personnel, production and marketing functions. They need information on personnel implications of marketing decisions, or the impact on production of a new distribution strategy, or the labor costs associated with higher sales.

Where each department has its own batch processing operations, the computer is of little value in answering such questions. However, with a data base approach, the Dickensian super-clerk rushes from one department's books to another, searching and correlating the data. The structure of the stored data is agreed upon centrally so that interdepartmental usage is possible.

The data within a corporation (or other organization) will increasingly be regarded as a basic resource needed to run the corporation. As with other basic resources, professional management and organization of the data are needed. The importance of efficient use of data for production control, marketing, accounting, planning and other functions will become so great in a computerized corporation that it will have a major effect on the growth and survival of corporations in a competitive marketplace.

In government departments and the massive data factories of modern man, the Dickensian super-clerks will make the difference between data being used efficiently, facilitating delicate control mechanisms, and data being a labor-consuming encumbrance of sluggish bureaucracy.

Value of Data

The value of data depends on the uses to which it is put. Often today, data needed in an important decision-making process exists somewhere in an organization in a machine-readable form but is not available to the decision makers when they need it. Furthermore, the cost of producing new computer programs and modifying old ones is often extraordinarily high because the data is not in the right form.

To make data as useful as possible and to control system development cost, appropriate design of data systems is necessary. Decision makers can have far better information than they had before computers, and they can have it immediately when they need it. However, the task of building up the information sources is complex, and many managers have underestimated the difficulties and time involved.

A corporation will have different collections of data for different purposes in different locations. They may be linked by telecommunications to the machines or people who employ them, and they can differ widely in their structure.

In earlier DP, one or more "files" of records were kept for each application. The intention of a data base is to allow the same collection of data to be shared and to serve as many applications as is useful. Hence, a data base is often conceived of as the repository of information needed for running certain functions in a body such as a corporation, factory, university or government department.

Such a data base permits not only the retrieval of data but also the continuous modification of data needed for the control of operations. It may be possible to "search" the data base to obtain answers to queries or information for planning purposes. The collection of data may serve several departments, often cutting across political boundaries.

Dream Data Base

In the much-publicized dream of a data base, a corporation or other organization keeps all its data in a large reservoir in which a diversity of data users can go fishing. Such a data base would be highly complex, and in general the dream is far from being achieved in reality. A complex data base has to be built up stage by stage.

In reality, today most data bases serve a varied, but limited, set of applications. One computer may use many different data bases. Eventually, the data bases for separate related functions may become combined where this integration can increase the efficiency or usefulness of the overall system.

A major task for most corporations is to decide what data bases they need, where they are best located,

(Continued on In Depth/4)

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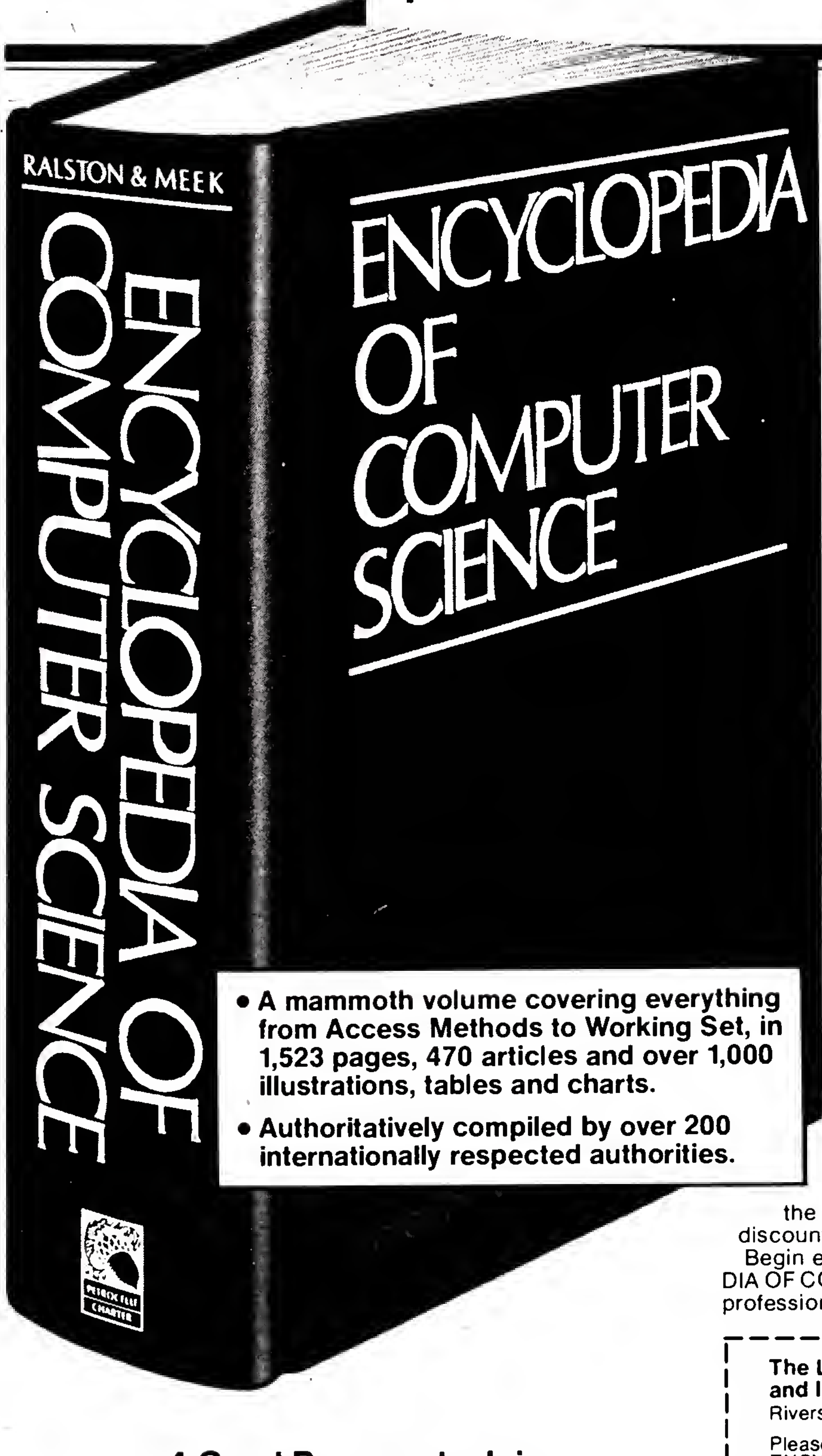

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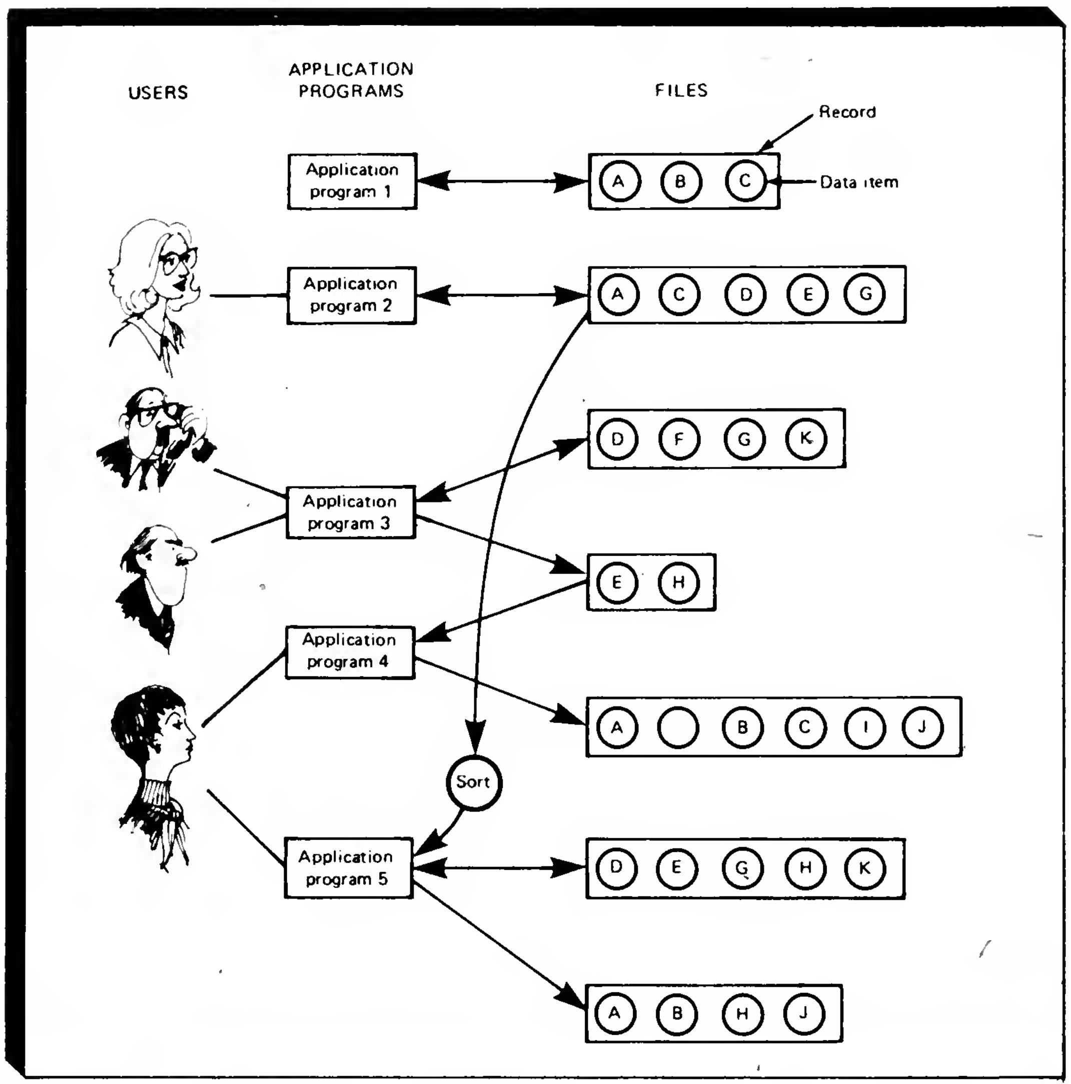

Figure 1. A File Environment

(*Continued from In Depth/3*)

what data should be stored in them and how they should be organized. Large progressive corporations already store a gigantic amount of information in their computer storage units but need to organize it better. The amount of data stored will increase drastically, and the ways the data are organized will be fundamentally changed to increase their usefulness.

Critical to the whole subject is understanding how the end users employ data. The data for a computerized corporation needs to be cleanly thought out, consistent among different users and structured as stably as possible. There are formal techniques for doing this. They need thorough involvement of the end users.

Figure 1 illustrates the way data is organized for computers that do not use data base techniques. There are many files of records, some on tape and some on quickly accessible media such as disk. The records contain data items, shown as circles in Figure 1.

When a program is written for a new application or a variation of an old application, there may be a file that contains the required set of data items. Often, however, there is not, and a new file has to be created.

Suppose that a new user request needs a file with data items A, F and H. These data items do not appear together in the existing files in Figure 1. Other files must be sorted and merged to obtain the new file, but this will not be straightforward if, as with the marketing problem above, the existing files do not have the required sets of keys. There may not be an H data item for every pair of A and F data items.

There are three problems with the organization of data in files as in Figure 1. To understand them the reader should imagine hundreds or thousands of files rather than the seven in the figure.

First, *there is a high level of redundancy.* The same type of data item is stored in many different places. The different versions of the same data items may be in different stages of update. In other words, they have different values. This may give the appearance of inconsistency to users. A manager obtains a report saying one thing and a terminal inquiry says something different.

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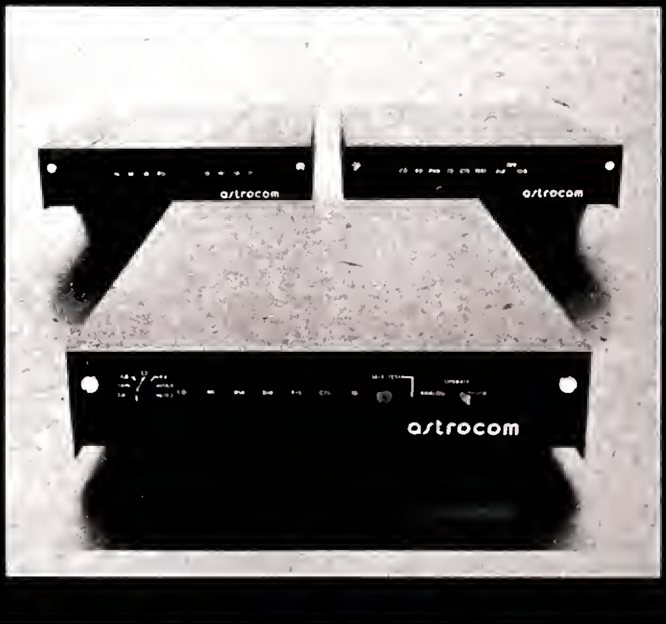

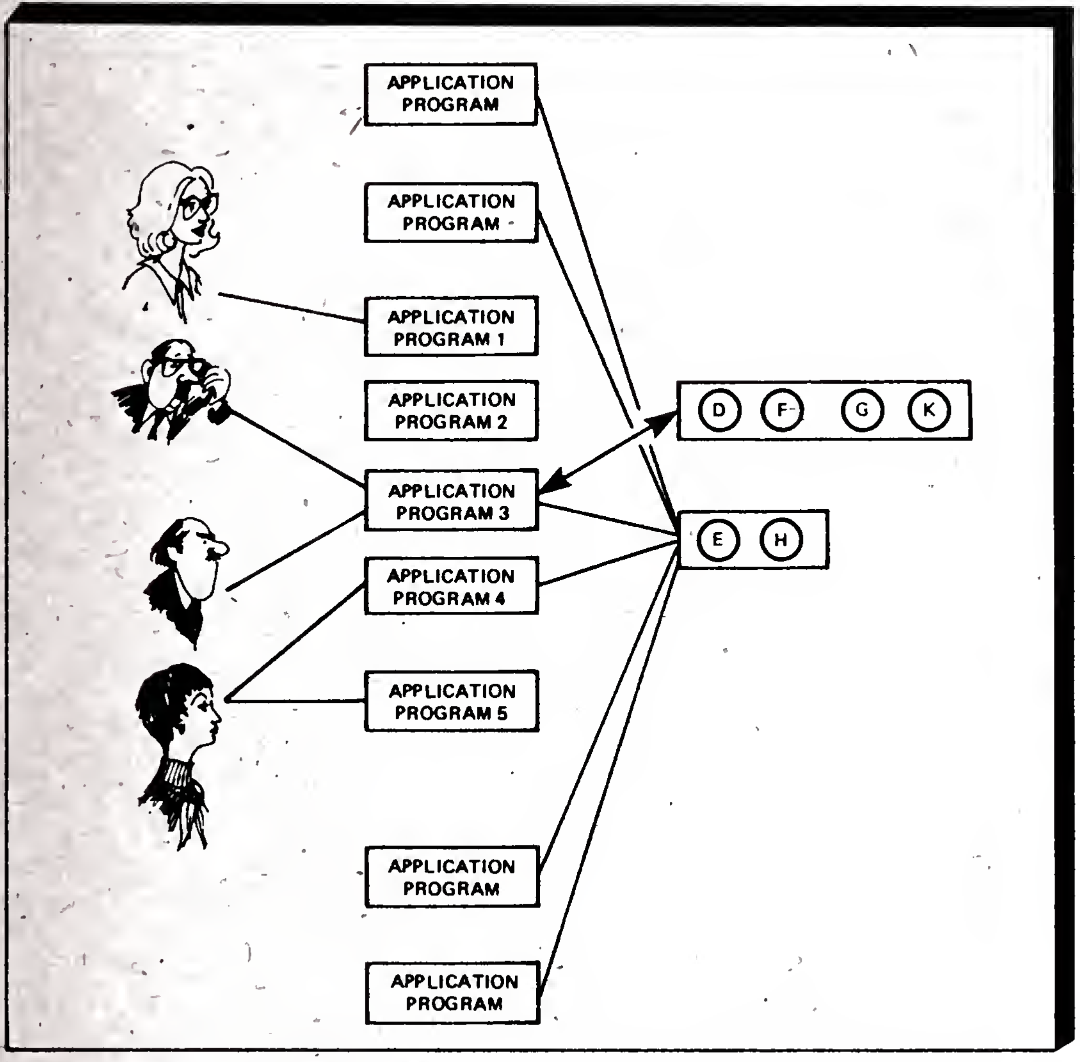

Figure 2. One file becomes used by multiple applications.

the same data item, it is difficult to maintain consistency or to ensure integrity of the data items.

Second, *a file system is inflexible.* Requests for information which require data items to be grouped in different ways cannot be answered quickly. Most ad hoc queries from a user employing a generalized query language cannot be answered. Although the data exists, information cannot be provided relating to that data. The data cannot be processed in new ways without restructuring.

One sometimes hears the protest from management: "We paid millions for that computer system and cannot obtain the information we want from it."

Third, *it can be expensive to make changes to a file system.*

Suppose that application program 3 in Figure 1 has to be changed in such a way that its record has to be modified. Unfortunately, application program 4 uses this same record; therefore, application program 4 has to be modified. Many other application programs may also use the same record (Figure 2) and all have to be changed.

A seemingly trivial change in a file environment sets off a chain reaction of other changes that have to be made. This upheaval is expensive and the necessary programmers are doing other work. Sometimes the modifications are difficult to make because the applications were not adequately documented.

As time goes on, this problem becomes worse because more and more programs are created.

Computer data in an organization is no more a static entity than are the contents of the organization's filing cabinets. The details of data stored, and the way it is used, change continuously. If a computer system attempts to impose an unchangeable file structure on an organization, it is doomed to the types of pressure that will result in most of the programming efforts being spent on modifying existing programs rather than developing new applications.

Figure 3 shows how programming costs have tended to change in organizations. The total programming

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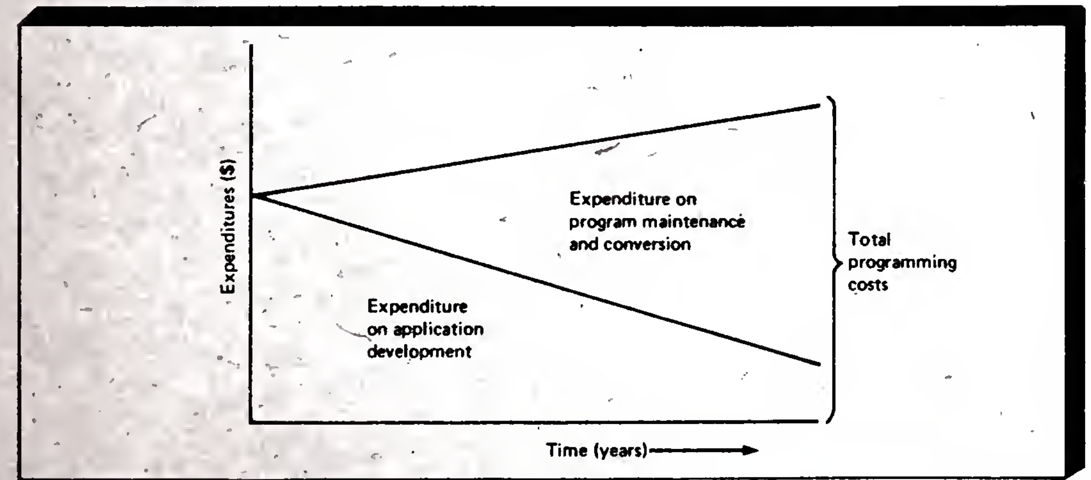
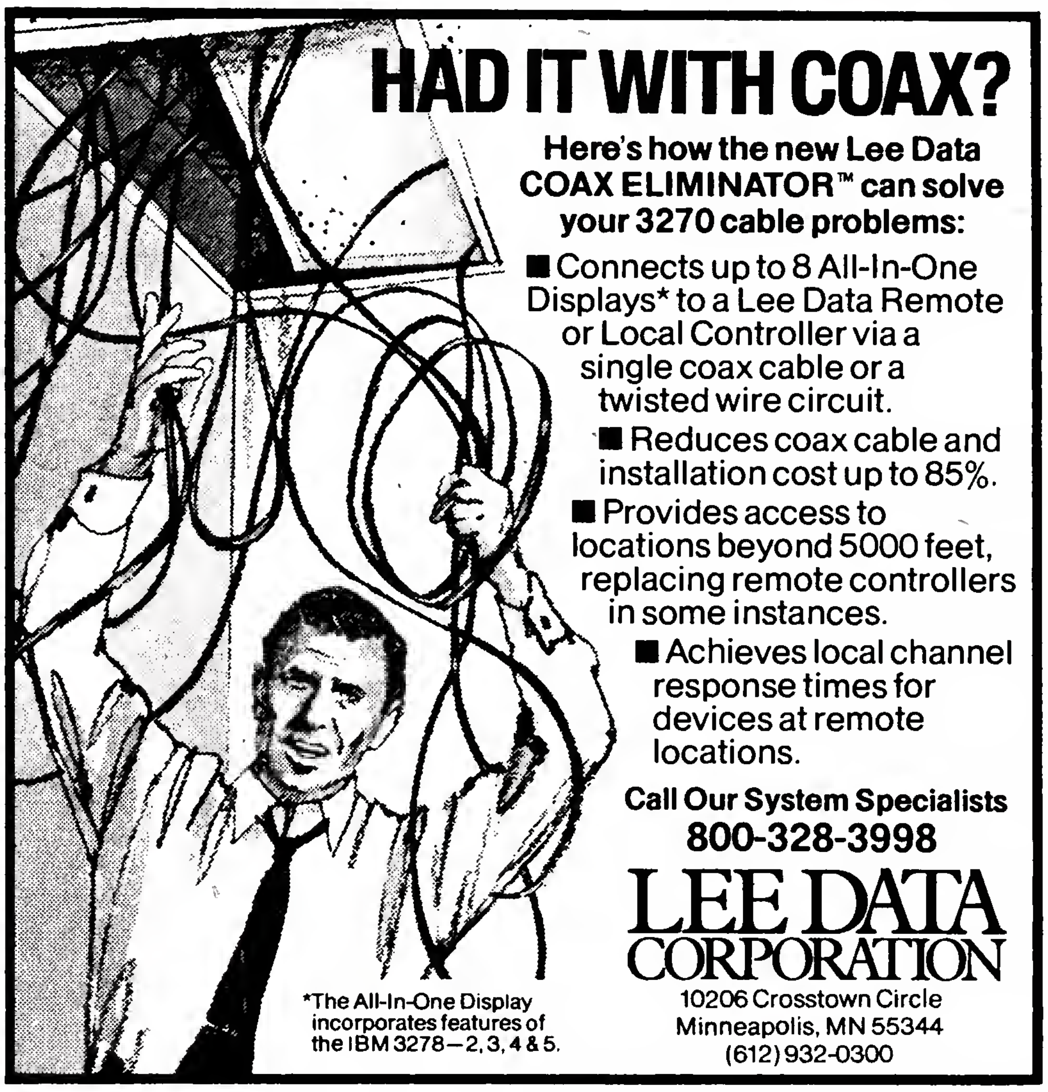


Figure 3. New application progress is often deferred by the rising cost of modifying existing programs and files.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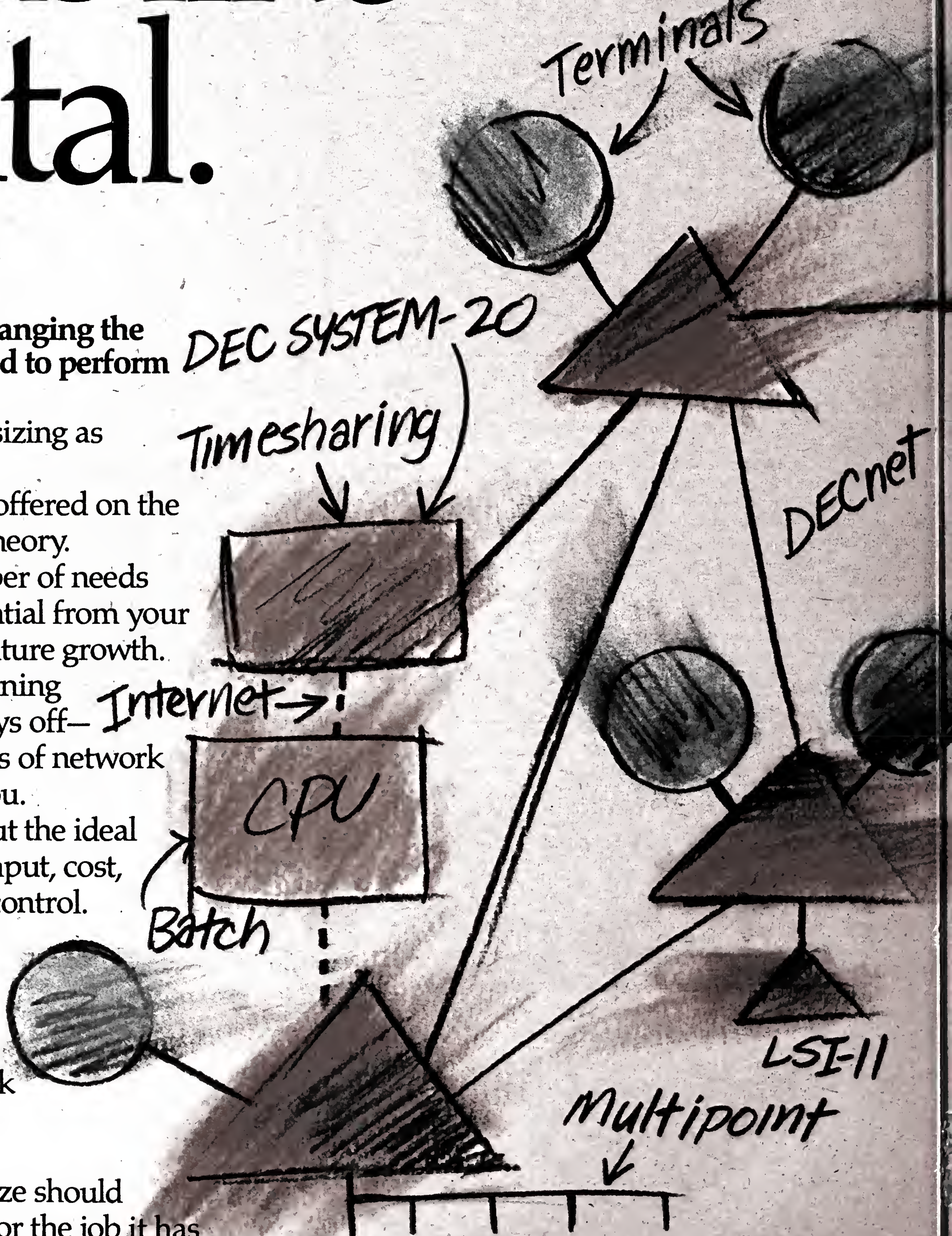

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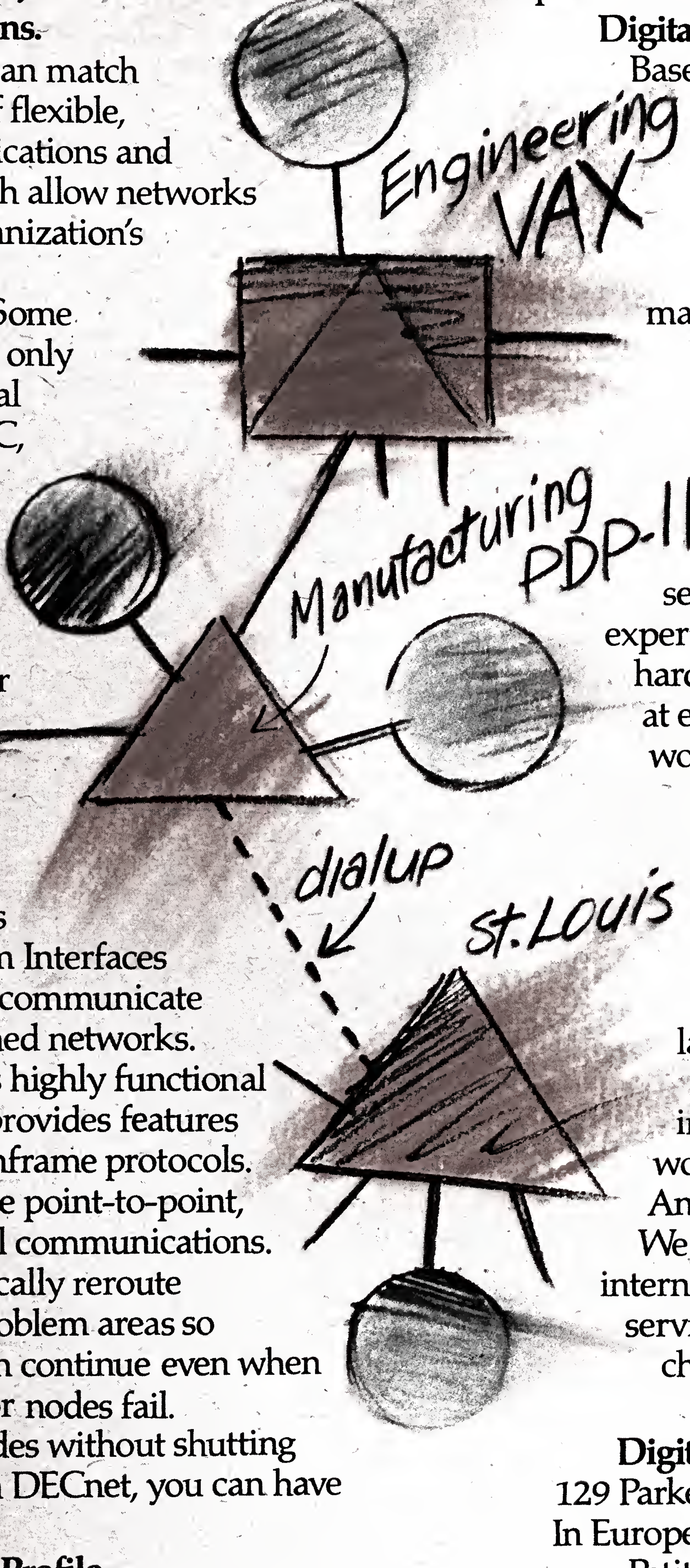

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(Continued from In Depth/5)

costs in a typical organization have grown, becoming a higher proportion of the total DP budget. However, the number of programming worker-hours spent on new applications has fallen steadily. The reason is that the effort to maintain or modify the existing programs becomes greater and greater.

It is often thought by systems analysts and DP managers that existing programs which work well can be left alone. In reality, however, the data they create or use is needed for other applications and almost always needed in a slightly different form. New data-item types are added. New record types are needed with data-item types from several previous records. The data must be indexed in a different way. The physical layout of data is improved. Data bases for different applications are merged, and so forth.

The term "maintenance" is used to refer to the rewriting of old programs to make them conform to new data structures, new operating systems, terminals and other system changes. Maintenance, if not consciously controlled, tends to rise as the number of programs grows. In some corporations it has risen to the disastrous level of 80% of the programming budget.

One of the main objectives of a data base system is that new programs using the data in a modified form should be able to do so without having any effect on programs that use the same data in its old form. Furthermore, a program may be modified, changing in some way the data it uses, without disturbing any other programs that use that same data. In other words, each program should be insulated from the effects of changes to other programs, and all programs should be insulated from the effects of reorganizing the data.

Data base systems attempt to lower the maintenance costs by separating the records the programmers perceive from the records that are physically stored. You might think of the programmer as perceiving an imaginary record — a record that does not exist in physical reality. The data base management software derives this record for the programmer from the collection of data that is physically stored.

Data Base Management Systems

The data base management system (DBMS) is the entity that provides programmers or end users with the data they request. Like a conjurer pulling different-colored handkerchiefs out of a hat, it derives its users' make-believe records from its store of data. It finds out what physical records contain the data in a given request, has a means of locating those records and from them derives the logical records that were requested.

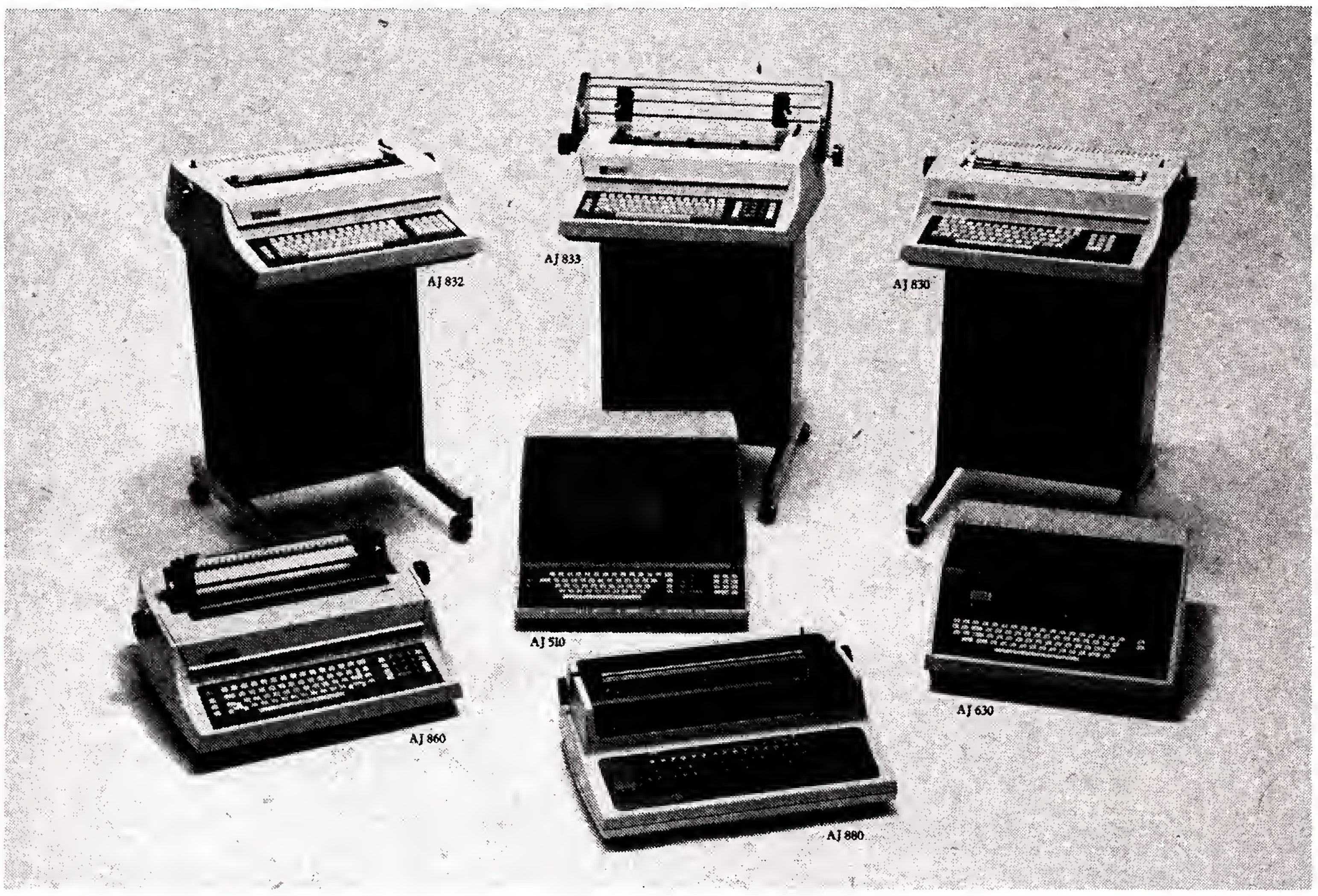
All the major computer manufacturers provide DBMS with names such as IMS, IDS, DMS and IDMS (I in these names stands for Information or Integrated, D for Data, M for Management and S for System.) Independent software companies have also provided DBMS with names such as Total (Cincom Systems, Inc.), Adabas (Software AG), IDMS (Cullinane Database Systems, Inc.) and System 2000 (Intel Corp.).

It is generally not necessary for end users to know how these products work. The reader can obtain more easy-to-read details of the technology from the author's book, *Principles of Data-Base Management.*

Are You Data-Independent?

A data base is intended to make data independent of the programs that use it. Either data or programs can be changed without causing the other to have to be changed. The data can be easily reorganized or its content expanded. Old application programs do not have to be rewritten when changes are made to data structures, data layout or the physical devices on which data is stored.

This independence of data is essential if it is to become a general-purpose corporate resource. In the past, data structures have been devised by a programmer for his own use. He writes a program to create a file of data. Usually, when another programmer needs the data for another purpose, he finds it is not structured in the way he wants, so he creates an-



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other file — hence the duplication in Figure 1.

Data independence is one of the most important differences between the way data is organized in data bases and the way it is organized in the file systems of computers that do not use data base management software. Each programmer can have his own logical data structure and can program in blissful ignorance of how the data is really organized. When the data organization is changed, the old programs still work.

This facility makes the data base software complex. However, without it, new application development can be immensely time-consuming and prohibitively expensive because it becomes necessary to rewrite existing programs or convert existing data. The total number of worker-years that a corporation has invested in application programs grows steadily. The programmers are long since gone, and it is too late to complain that their documentation is inadequate.

The greater the number of programs, the more horrifying the thought of having to convert them or their data, so there is reluctance in the DP department to respond to the latest needs of the end users.

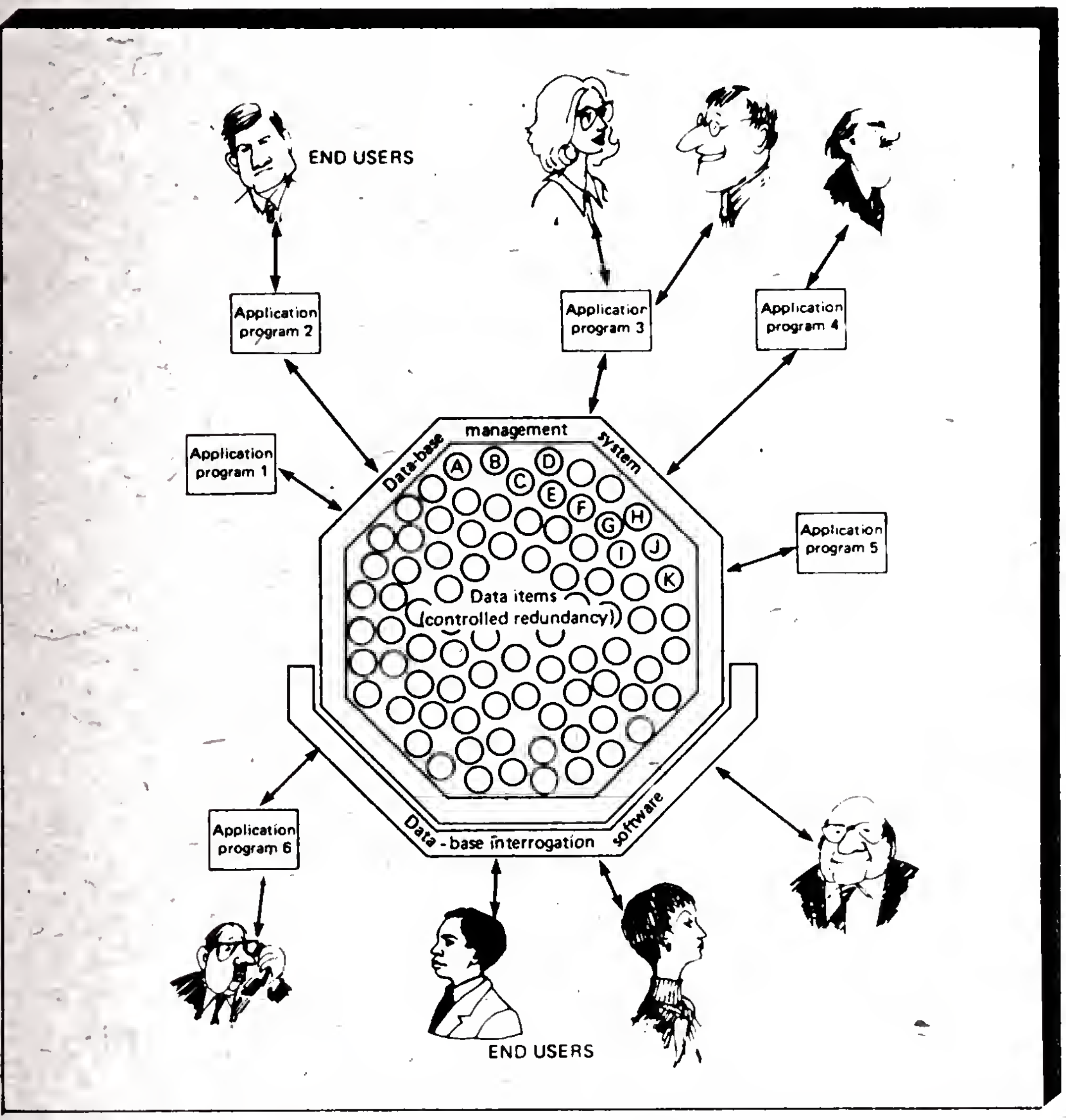

Figure 4. Application programs derive their logical records from the data base, and end users gain direct access to the data base with high-level data base languages.

Ad Hoc Requests

New, unanticipated requests for information are increasing. As end-user management realizes the potential value of the stored data, its requests for information increase. Much future growth can be expected in the number of data requests from users as they better comprehend the potential of computers.

However, to the DP manager without appropriate data bases, these requests can be a menace. He does not have the programmers to deal with the requests. Many end users in a file environment are finding that important requests for data or reports are not met.

The concept of data base, shown in Figure 4, should enable the DP department to be more responsive to such requests. However, for this to happen, the right logical data structures must be created, and this requires close cooperation between the data base designer and the end users.

In the organization of Figure 4, the data items are pooled to form a data base with software that can extract any combination of data items a programmer wishes. In reality the data items are usually not stored entirely in isolation, as suggested by Figure 4, but in groups of related data items, sometimes called records, sometimes segments. The software may be able to extract segments and combine them to form the records an application program uses.

Interrogation Software

Another important feature shown in Figure 4, at the bottom, is the data base interrogation software. This enables some users of the data to interact directly with the data base without application programs having to be written. Instead, the user employs a dialogue at a terminal, or possibly fills in a form to express his needs.

Data base dialogues for end users are becoming increasingly important. They enable information to be extracted from computers, and reports and listings can be generated *without* programming. Increasingly, end users will interact directly with data base systems.

Figure 4 suggests that a corporation's data is stored in a large reser-

(Continued on In Depth/10)

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(Continued from In Depth/9)

voir in which the users can go fishing. Although this figure forms a useful way to explain data base concepts to management, it is nevertheless a naive view of a data base — in some cases dangerously naive, as we shall see.

The data items inside the octagon of Figure 4 have to be organized in such a way that they can be found and accessed with sufficient speed. The organizing process introduces many complexities into data base design. The structuring problems can be sufficiently great that a designer may sometimes elect to employ separate data base systems, even though they contain much of the same information.

The "reservoir" concept of management information systems, or other information systems, is much easier to conceive than to implement. It is proving a very complex and lengthy operation to build up such data bases, and with current hardware it is expensive to search them sufficiently quickly to give real-time answers to unanticipated queries.

Flexibility, however, is vital. In many corporations, systems (of accounts, organization, methods, responsibilities and procedures) have been more of a hindrance to change than physical plant and unamortized capital investments. For some, retraining the whole labor force would be easier than changing the system. Quite frequently, the computer has contributed to the inflexibility by dressing allowed procedures in a rigid electronic framework.

The computer has been hailed as one of the most versatile and flexible machines ever built, but in many corporations, because of the difficulty and cost of changing programs and data bases, it becomes a straitjacket that precludes change and even constrains corporate policy. The comment is often heard, "We cannot do that because change is too difficult with our computer system."

One of the most difficult tricks we have to learn is how to introduce automation without introducing rigidity. The computer industry is only now beginning to glimpse how that can be done. Data base techniques are an important part of the answer.

Constant Change

One of the most important characteristics of DP is the planning for constant change. Dynamic restructuring of the data base must be possible as new types of data and new applications are added. The restructuring should be possible without having to rewrite the application programs and in general should cause as little upheaval as possible. The ease with which a data base can be changed will have a major effect on the rate at which DP applications can be developed in a corporation.

It is often easy for a systems analyst to imagine that the data structure he has designed for an application represents its ultimate content and usage. He leaves some spare characters in the records and thinks that these will accommodate any change that

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will occur. Consequently, he ties his data to a physical organization that is efficient for that particular structure.

But time and time again he is proven wrong. The requirements change in unforeseen ways. The data structures have to be modified, and consequently many application programs have to be rewritten and debugged. The larger an installation's base of application programs, the more expensive this process is.

As we commented, 80% of the programming budget is being spent on maintaining or modifying past programs and data in some installations. This ratio is extremely inhibiting to the development of DP in the organization. It is desirable to write today's programs in such a way that the same ratio will not apply five years hence.

If we continue to write programs without data independence, the maintenance difficulties will grow worse as the numbers of programs grow, until the impact cripples the capability to take advantage of the new hardware and techniques that are now under development.

Many Failures

The decade ahead is likely to be an era of great invention in the techniques for storing and organizing data, and many of the new techniques will be highly complex. The greater the rate of introduction of new techniques or modified data organizations, the greater the need to protect the application programs and programmers from them. This is one of the main reasons we need data base systems rather than merely file systems without data independence.

However, many data base installations have failed to lower the maintenance costs and failed to respond to end users as needed. The main reason has been that the data structures represented in the data base have not been appropriate.

To achieve satisfactory data structures, careful modeling of the data is needed, as described later in this report. This modeling process needs a high degree of involvement by the end users.

There are several common misconceptions about data base systems that need clarifying.

First, a data base, or DBMS, does not imply a "management information system." There is no direct relationship between the terms. In their initial use, most data bases should be thought of merely as a way of storing data for conventional applications and making that data more easily accessible to end users. Data base techniques are justified by giving faster application development, lowering the cost of maintenance and enabling much end-user data to be obtained without programming. They permit the DP department to be responsive. One type of data base application is the providing of information to management.

A second delusion is that a data base system is sometimes described as containing all the data items in a corporation or a division. Typical comments on the subject from journals such as the *Harvard Business Review* include the following misconception: "If the company had maintained all its computer-readable data in a single pool or bank — in a so-called 'data base' — and if the company had structured this base of data so that a program for virtually any feasible use could have been run from this data base, then it would have been a matter of sheer expertise and flair for a good, experienced programmer to concoct a program that pulled the desired information together." And, "The data base concept structures EDP activity in such a way that all of a company's computer-readable data are merged in a single pool, which is used to run both routine programs and programs written in response to ad hoc requests" [R.L. Nolan, "Computer Data Bases: The Future Is Now," *HBR*, September-October 1973. Quoted with permission].

Any attempt to implement so grand a notion is doomed to disaster before it begins. One of the reasons for data base techniques is that files or data bases that were separate can later be combined. In this way, larger collections of data can be built up with a subsequent drop in data redundancy and increase in data base interrogation capability. However, to begin with the notion that the data base will serve everyone who uses data is asking for trouble.

Related to the foregoing delusion is the notion that an organization will have *one* data base. In reality it is likely to have many data bases, eventually perhaps hundreds. Many different data bases may be used on the same data base system, but they will be both physically and logically separate. They should be built with a common schema language and common design policies because linkages between them will be forged in the future. The DBMS should be common to all, but the data bases themselves entirely separate.

Systems as Infrastructures

A better way to think of data base systems is that they form an infrastructure that will allow better use of DP in the future. If the principles of this book are followed, they force clear thinking about data. A clearly defined representation of the corporate data, modeled in a relatively stable form, will steadily grow.

This data modeling should keep well ahead of the implementation of specific data bases. The implementation will be such that the data representation can change and grow, usually without forcing the rewriting of application programs. The programs will not have to be rewritten when better hardware is installed.

At today's state of the art, then, most corporations should not talk about a corporatewide data base, but rather a *corporatewide organizing principle* that forms the structure for data base development. An essential of this principle is that the data descriptions and data dictionary be standardized throughout the corporation.

The growth that the infrastructure permits should have two characteristics. First, it should be planned, insofar as is possible. Although planning is desirable, it must be recognized

(Continued on In Depth/12)

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(Continued from In Depth/11)

that a data base will inevitably be used in ways that were not anticipated when it was designed. Second, the plan should involve small incremental steps, one application or one improvement to be implemented at a time on each data base.

The first applications selected for use with a data base should involve three characteristics. First, the data base should not be too complicated. Second, the application should be one that is clearly cost-justifiable. And third, *the management of the user departments should give full support and cooperation.*

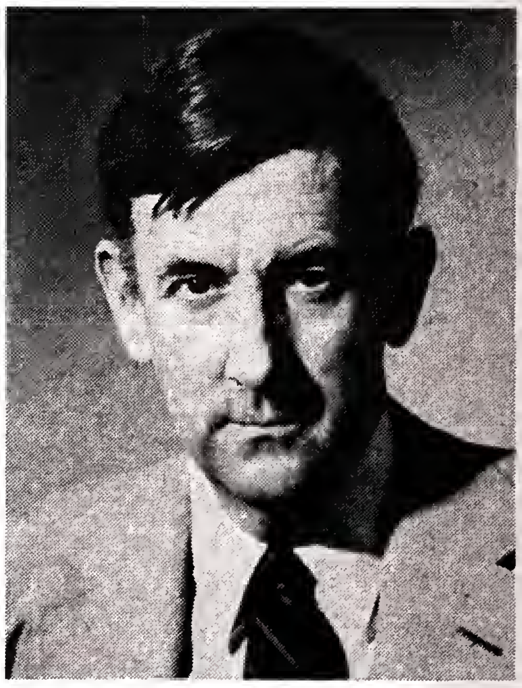
As the data in a corporation is defined and modeled (as described later) more separate data bases come into existence. When more data bases exist, more projects are undertaken using these data bases. Many such projects may go on at the same time. Most projects using the data bases will be relatively short in duration — not more than a few months. Many of the incremental steps will be very short to implement, such as the production of a new type of report from an existing data base.

After several years of stage-by-stage buildup, the overall data base systems will begin to look impressive if they were appropriately directed toward overall goals. To be successful, the DBMS used must provide a high level of data independence so that growth in the structure of the data base can continue without rewriting programs.

Unfortunately, although this stage-by-stage buildup is the best formula for success, an organizationwide, all-embracing implementation sometimes appears more attractive to systems analysts or to management. Few projects for a grandiose "data base to end all data bases" have met with other than bitter disappointment. If grandiose plans are needed, they should be for a standardized corporatewide framework within which data bases evolve and interlink a stage at a time.

Great cities are not built in one monolithic implementation. They grow and evolve and are the sum of many smaller pieces of work. If their structure can be planned so that the piecemeal implementations fit into an overall design, they will be more workable cities.

The stage-by-stage buildup of a computerized corporation requires good forward-looking planning of what should be in the data bases. The end users have a vital role in helping the data administrator create data bases that are stable and permit stage-by-stage application development. If stable data bases are not created, when new applications come along they cannot use the existing data; new data is created for them and the concept of shared subject data bases disintegrates, eventually resulting in the maintenance problems illustrated in Figure 2.



James Martin is generally acknowledged as the computer industry's most widely read author, best attended lecturer and foremost authority on the social and commercial impact of computers. A British citizen, he took an M.A. degree in physics from Oxford University.

He spent 19 years with IBM, 10 of them at the Systems Research Institute in New York. Since his departure in 1978, he has been involved in a number of projects, including studies and consultation on the computing environment of 1985 through 1990, video-based courses on information processing and a projected television series.

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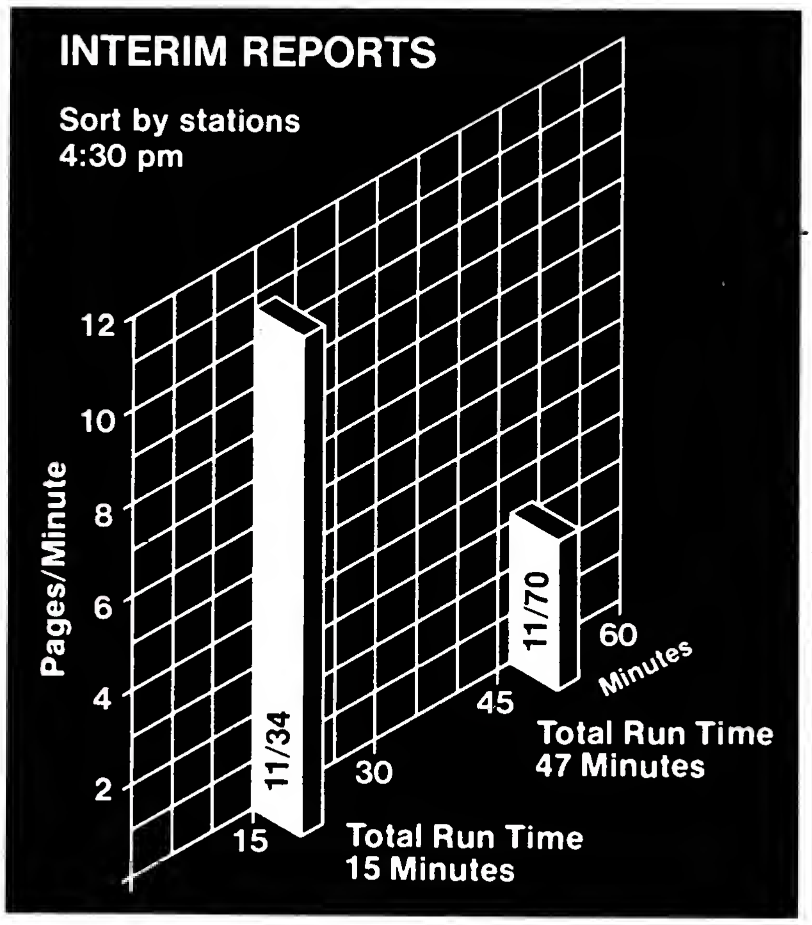

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Playpens and Cookie Jars:

An Invitation to Computer Crime

by Jay BloomBecker

The focus on computer geniuses and whiz kids leads to the unfortunate assumption that understanding the criminal personality will solve computer crime. But there is also an environmental factor, a way in which the criminal views the computer before he decides to commit the act. One may see a cookie jar, while another sees a war zone. The perception determines the type of computer crime.

The fashion, both journalistic and professional, is to see all computer criminals as having the same general characteristics: "Perpetrators are usually bright, eager, highly motivated, courageous, adventuresome and qualified people willing to accept a technical challenge. They have exactly the characteristics that make them highly-desirable employees in data processing" (Donn Parker, *Crime by Computer*).

"The common denominator in nearly all cases of computer fraud has been that the individual is very much like the mountain climber — he or she must beat the system because it is there" ("The Computer Criminal," F.W. Dennis, *Security World*, September 1979).

Fortune has called Parker a leading expert on the history of computer crime, and *Security World* is one of the leading security industry journals in the U.S. Thus it is not surprising that the point of view expressed in both quotations — at least a moderate glorification of computer criminals — is reflected in those newspapers that find heroic and unusual feats sell far better than crimes of quiet desperation.

Technically simple crimes like the one committed by Stanley Rifkin are written up as though the perpetrator had used an intelligence only slightly short of Einstein's to commit them. The 15-year-old who penetrated an ill-guarded University of California computer system and stole a relatively small amount of computer time from it is called a whiz kid, though nothing in his biography would qualify him for such an appellation.

Accurate Picture?

But is this picture of computer criminals accurate? Does it help us to prevent computer crime? Based on my analysis of many of the cases in the files of the National Center for Computer Crime Data, the answer to both questions must be a resounding no.

Many computer criminals just aren't that smart and may diverge from the genius stereotype in just about every characteristic. They may know next to nothing about computers, abhor challenges and care nary a whit about the mystery of the machine.

In addition, I have found that while it may sell newspapers, the belief that only geniuses commit computer crimes doesn't do much to help sell security — particularly those measures users can take to protect themselves from ever-increasing vulnerability to digital disaster.

The focus on computer geniuses not only oversimplifies the problem, but also leads to the unfortunate assumption that understanding the criminal personality will lead to solutions to computer crime. Suppose we could isolate the numerous personality types that are associated with computer crime. What then? One group would probably be computer geniuses. Should we then instruct personnel not to hire any? Another group might well be people who dislike computers, and a third might be those who like computers better than people. How many employees would be left if we chose not to hire from any of these three groups?

I think it is important to recognize the environmental factors involved in virtually all crimes. We can catalog "criminogenic" environments and use them to exemplify the range of attitudes that can be inferred to coexist with the computer criminal's decision to commit computer crime. By criminogenic environment, I mean the computer environment as computer criminals see it before they decide to commit a crime.

Where one type of computer criminal will see the computer environment as a cookie jar — the source of enough money to meet personal needs — another might see it as a playpen — simply a place to play computer games for as long as he likes. These different perceptions will generally lead to very different types of computer crimes and, perhaps more significant, will call for different types of security.

In this article I will suggest seven attitudes toward the computer environment that summarize much of the case data I have seen. Admittedly, this typecasting is an oversimplification. It actually represents somewhat arbitrary points along a spectrum of hostility toward the rules that would prevent computer crime.

Each of the attitudes, in its own way, can be adapted to the goal of committing what would otherwise seem a violation of either company rules or the law.

To focus on these points is not to pretend that the computer criminals described acted from motivation consisting of only one element. Frequently several of the points of view that we have arbitrarily separated coexist in the motivation of an individual computer criminal.

Unreliable Information

When we talk about the motivation of a computer criminal, we must keep in mind that almost all of the self-descriptive information relied on is unreliable in that it is taken from self-serving statements made by people quite aware that every word uttered could be used against (or for) them. Indeed, it seems quite plausible that defendants in computer crime cases would tailor their statements of motivation to fit into previously established categories on the assumption, aided and abetted by their attorneys, that better understanding of their motivation would facilitate more lenient sentencing.

Further, it should be evident that this set of categories is not the only one that might fit the reported cases of computer crime. To my knowledge, however, it is the only such set that has been proposed. I invite readers to comment on evidence of computer crimes that doesn't seem to fit these categories and to offer alternate categories or observations.

Different Interpretations

The computer environment means different things to different people.

(Continued on In Depth/14)

(Continued from In Depth/13)

Thus the categorization offered here can serve a variety of purposes. For the manager of a computer center, or any other company managers particularly concerned with the overall problem of computer crime, these categories demonstrate symptoms of potentially criminogenic environments and red flags alerting the manager to the need for intervention either by those with personnel or other security functions. For the personnel manager, these categories represent a set of concerns that should be kept in mind in attempting to implement the personnel security policy of the company.

In fact, the categories are at a level of generalization that allows them to be applied to any complex organization, not just that of a computer environment but to a fish market, a fraternal group or the U.S. Senate. All the specific details in this article are based on computer crimes, but this is not a necessary feature of the analysis.

The personnel manager might also consider the usefulness of these categories in terms of evaluating employee attitudes. If an employee has tended to see past work situations in terms of the jungle, the war zone or the soap box, that employee might be less desirable than one who did not possess these attitudes. I am not aware of any tests designed to develop indexes indicative of these attitudes, but if such tests do not exist, enterprising psychometricians can soon devise them.

The Computer as Playpen

About the only discordant note in a one-hour public television network paean to the wonders of the computer as an educational tool for young children was a teacher's observation that students became so enthralled with operating the computer that they would erase the names of fellow students from computer sign-up lists or destroy the sign-up lists altogether. The speaker, a middle-aged, light-haired teacher, smiled as she described this aberrant behavior of her fifth- and sixth-grade students. No hint of disapproval of their disregard for the rights of others clouded her delight that the computer so motivated them.

Older students demonstrate the same lack of morality. Prof. John Carroll took a survey of students in two advanced information systems courses at the University of Western Ontario. Thirty-four percent said they had tried to obtain computer time without paying for it, and the same percentage had tried to penetrate the university computer's security system.

These examples demonstrate the fact, obvious to anyone who has watched people play computer games, that computer use can be intrinsically satisfying. They also suggest that the desire for satisfaction can frequently lead to the violation of others' rights.

When computer crime results from the attempt to gain satisfaction from working with the computer, we can categorize it as resulting from the playpen perception getting out of hand.

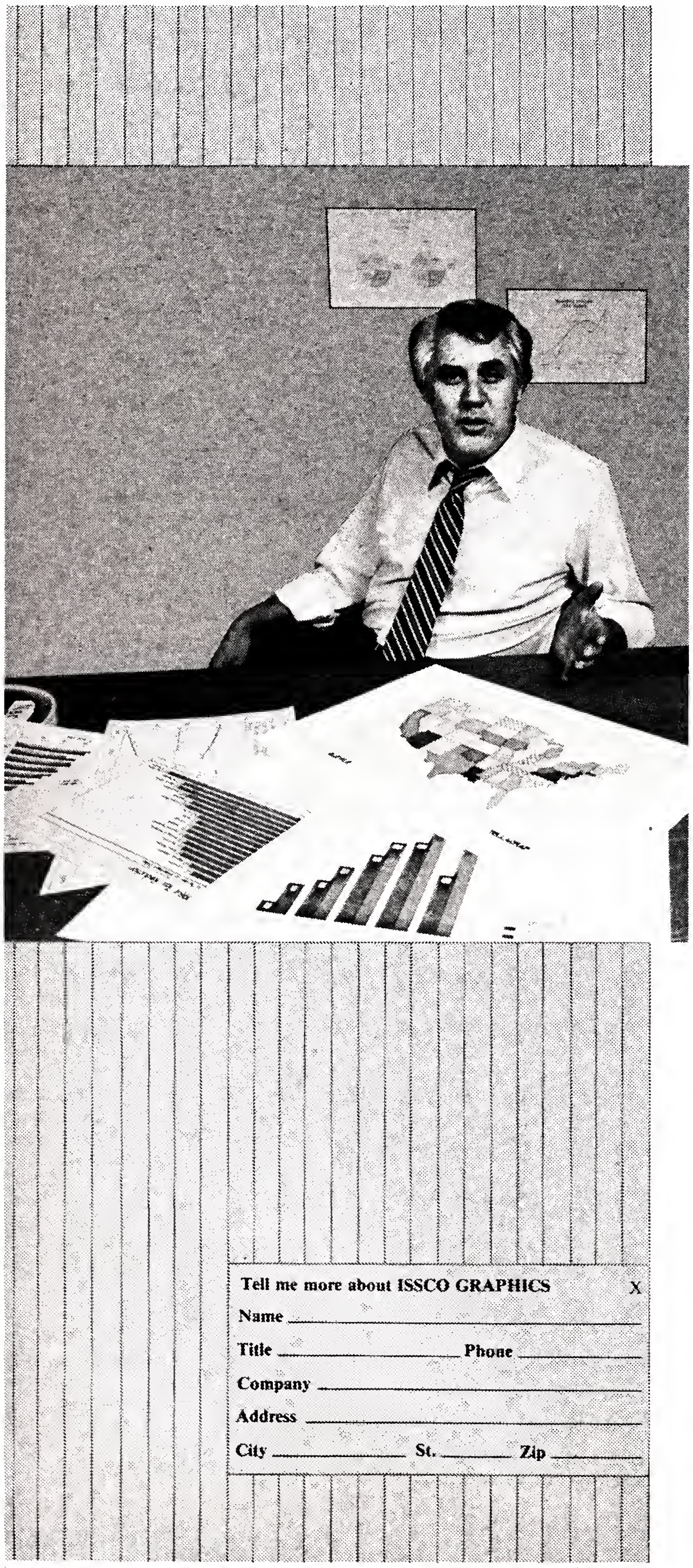
No Standard

Unfortunately, there is no computer industry standard to define precisely when playing has gotten out of hand. Thus, if a student uses an hour of computer time without permission, one university computer department considers it criminal theft of services and another views it as commendable ingenuity.

No set of ethics appears to provide a standard to distinguish *de minimus* use of computers for one's own enjoyment or other purposes from excessive use that constitutes a violation of company rules or the commission of a crime.

Donn Parker, studying ethical attitudes in the computing community, found substantial variations in different individuals' ideas about what constituted allowable conduct in a computer environment. He found no consensus on the appropriateness — or legality — of gaining unauthorized access to a time-sharing service, attempting to discover secret system commands or using a progam with knowledge that it was proprietary property (*Crime by Computer*).

Geoffrey Horwitz, a South African



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accountant, found exactly the same lack of consensus when he queried programmer trainees, M.B.A. students, auditors, computer managers and computer personnel who were not in management. In an article entitled "Computer People: How Honest? How Ethical?" in the South African journal *Systems*, Horwitz concluded: "The responses demonstrated one thing overwhelmingly: there is no consensus as to what is or is not acceptable behavior. Even in the most clear-cut cases of abuse, there is a sizable percentage of respondents who see nothing wrong."

That the environment is significant is underlined by his finding that: "For unexplained reasons, junior levels of computer personnel seem to set somewhat higher ethical standards for computer-related activities than do their managers or other groups in the sample. However, raw trainees do not necessarily fit into this pattern: there is presumably a time lag while they 'learn' morality from their slightly more experienced colleagues."

In addition to the unauthorized use of time (and often as a necessary prerequisite to it), attempts to compromise computer security systems are common to those with a "playpen" point of view.

An English group called "Crank" boasts of expertise in "computer piracy and security cracking." Members claim to have obtained files from universities and companies in England whose security "has never been broken," all with the ostensible purpose of making sure that computer security is improved. One needs to change the Crank members' motivation only slightly to wind up seeking to outsmart the computer for one's own benefit.

Rifkin Case

This may have been the dominant motivation behind Stanley Rifkin's infamous computer crime. When he pled guilty to charges arising from his theft of $10.2 million from the Security Pacific Bank, Rifkin described his reaction to seeing the diamonds he bought with the stolen money. "I was aghast," he said, explaining that this was the first indication he had that his scheme had really worked. He further explained his failure to take steps to secrete the diamonds, saying he hadn't made any plans for this contingency.

Implausible as the story may seem, it is consistent with Rifkin's general ineptitude as a thief and his rapid arrest after he returned to America. Further support for the idea that Rifkin had a playpen perspective comes from an associate who taught with Rifkin. "The guy is not a bank robber, he's a problem solver," Prof. Gerald Smith said.

The Federal Computer Systems Protection Act, which has been stalled in the U.S. Congress for several years, demonstrates the difficulty of using laws to attempt to deal with the problems of computer misuse. The act would make any unauthorized access of a computer a federal crime, a felony subject to investigation by the Federal Bureau of Investigation and prosecutable by the U.S. Attorney's Office. "Is that the appropriate punishment for someone who makes a Snoopy calendar?" computer personnel have asked.

The question suggests that some employee computer use is acceptable in some computer environments. But how much use is tolerable? Certainly when two employees open a computerized sheet music arranging and engraving company, they have gone too far [see U.S. vs. Kelley, fi #77-250 (E.D. Pa. 1977)].

In view of what has already been stated about the playpen attitude toward computer environments, certain security implications are obvious. Norms that clearly define allowable and excessive computer use must develop, and if the industry does not develop them, it is quite likely the courts will do so. In the meantime, each computer user must

(Continued on In Depth/16)

Jesse James Without a Gun

This personal reminiscence was written by H. Michael Snell, Stanley Rifkin's publisher at the time he illegally transferred $10.2 million from the Security Pacific Bank in Los Angeles. Snell, who now owns his own publishing firm in Wayland, Mass., provides interesting insights into Rifkin's personality and motivations.

Before I read about Stanley Rifkin's arrest, the words "master criminal" sparked conventional images in my mind: the diabolical Moriarty, Sherlock Holmes' nemesis; Al Capone; Ian Fleming's supervillains and Billy the Kid. I pictured a swarthy character who knew how to handle a gun and wouldn't hesitate to use it.

Stan Rifkin exploded this stereotype. When his name hit the headlines, I recalled the hours I had spent with him as his editor. Acquiring manuscripts for Dickenson Publishing Co. in Los Angeles, I met Stan at California State University, Northridge, where he taught computer science part-time. He had submitted an outline for a textbook on systems analysis and design, so I invited him to lunch and offered a contract.

He wrote for the right reasons: educational idealism balanced by desire for money and fame. Frustrated with the Ph.D. treadmill and unhappy with his meager part-time instructor's salary, he saw his book as an escape to a more glamorous world. He shared the dreams of many academics who feel blocked from great success and wealth, and he loved "get- rich-quick" stories, such as a friend who struck gold in California real estate, or the Silicon Valley's overnight millionaires.

Master criminal? I could sooner imagine a smoking gun in the hands of Winnie the Pooh. In fact, Stan resembled Pooh Bear: short, stocky, paunchy from too much good food and wine, a deeply receding hairline above an intelligent, sloping forehead. Quiet, unassuming, not the kind of guy who'd stand out at a cocktail party.

I recall a meeting with him shortly before he pulled the job. After chatting about wine-tasting and a UCLA extension self-help course he was taking to achieve "inner peace," we discussed his manuscript. "How much money can I make?" he asked. I shook my head. "Depends. Publishing can be like Russian roulette — five blanks before the bang." Since he had not progressed beyond the proposal and outline for his book, I figured he lacked the patience to finish the task. Back in my office, I wrote him off as another Walter Mitty who would never stick with one activity long enough for the payoff.

When I saw his picture in the paper, I did a double-take. Stan Rifkin? However, when I considered the nature of his crime, it made sense: intelligence, impatient ambition and special knowledge more effective than a .38.

Like all good programmers, Stan was a skillful problem-solver, fascinated by puzzles and games. Unfortunately, the ultimate game undid him.

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(*Continued from In Depth/15*)

evaluate its rules and practices. Unless limits on unauthorized computer use and the rationale for these limits are clearly specified, the user will continue to be vulnerable to the overreaching computer game player.

In the systems article previously mentioned, Horwitz suggested a number of actions the user might take to nurture high standards of ethics and honesty:

* Development of published "company standards" or "company policy" as part of an overall personnel standards or practices manual.

* Ensuring that all staff are conversant with these standards.

* Having periodic discussions on the subject, especially with trainees or new recruits.

* Inclusion of more discussion on the ethical "do's and don'ts" as part of formal programmer or operator training sessions.

* Reprimanding or, in extreme cases, dismissing employees who violate these published rules.

* Requiring computer staff to sign acknowledgments that all programs, systems and data are the exclusive property of the company and that no "moonlighting" is allowed without the prior consent of the company.

Land of Opportunity

Not too far removed from the playpen perspective is the attitude that the computer environment is a land of opportunity and that there is nothing much wrong with exploiting an obvious vulnerability in a computer system. Garry Trudeau, creator of the Doonesbury comic strip and one of America's most pointed social critics, summarized this attitude with the title for one of his books: *But the Trust Fund Was Just Sitting There.*

Unlike the game players described above, however, those who see the computer environment as a land of opportunity seem to be motivated not so much by challenge as by the lack of challenge. Where the game player might try hundreds of codes to find one that allows entry to the computer's operating system, the employee in the land of opportunity finds a vulnerability in the system, often in the course of learning the job.

For example, the operator of a check-printing device pressed the REPEAT button repeatedly when his check was being produced. Hardly the computer genius the media would have us think all computer criminals are, he took a dozen paychecks and attempted to cash them all at the same time.

More sophisticated but similarly opportunist, a purchasing agent in San Diego county exploited his position as employee when, knowing the troubles the county was having installing a new computerized system to control its purchasing disbursements, he set out to compromise the system. He created fictitious vendors, billed the county for nonexistent supplies that had ostensibly been delivered and, as a result, collected approximately $50,000. He knew the county's system quite well. Only his own impatient questioning about a $70,000 check he was expecting led to his ultimate detection.

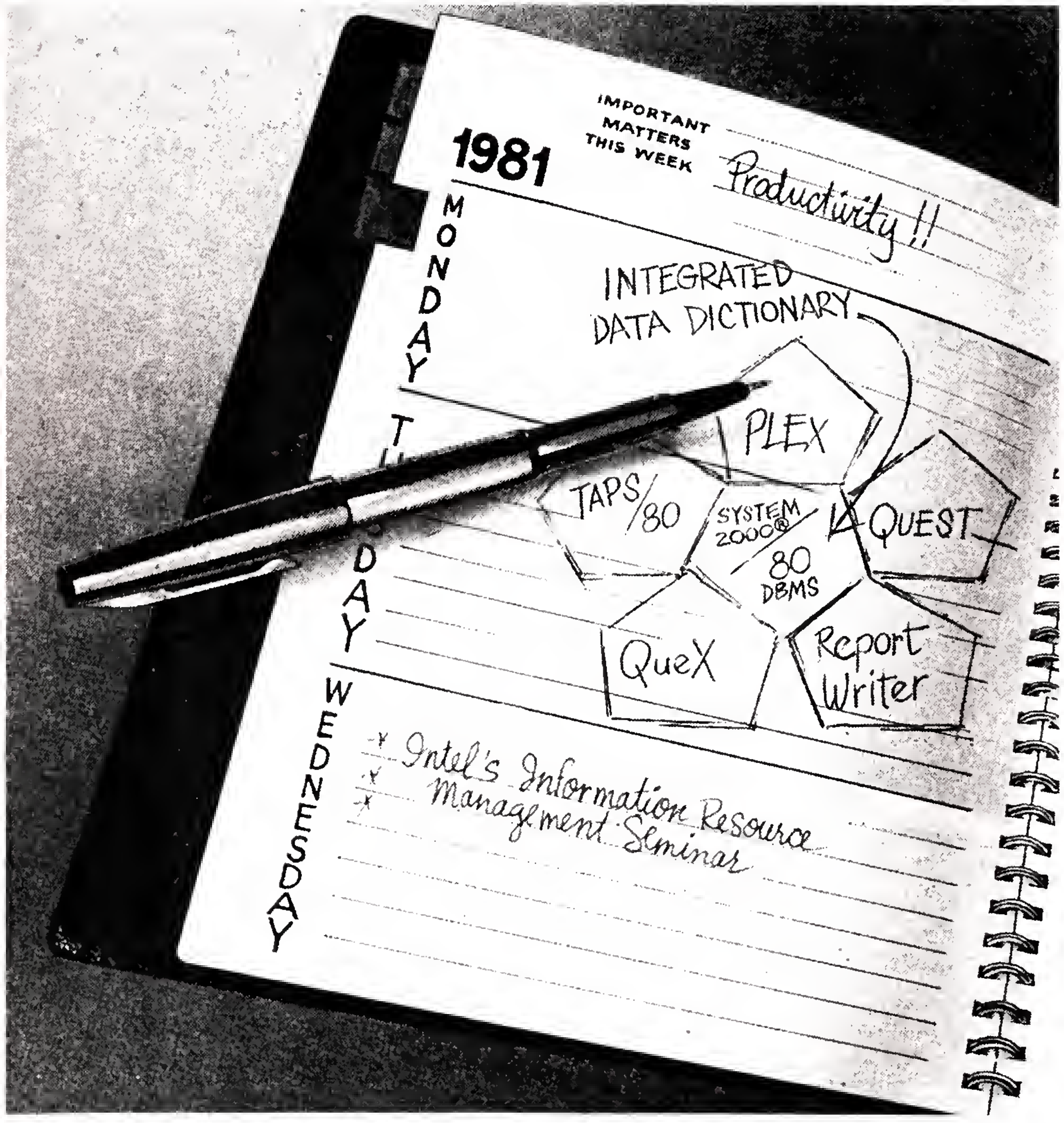
Question of Opportunity

One need not be a profound criminologist to realize that motivation is directly proportional to opportunity, and opportunity is inversely proportional to the security at work in a given system. If the opportunities are obvious enough, even the least sophisticated employees (or outsiders, for that matter) can be expected to try to exploit them.

Consequently, the need for systematic and extensive security cannot be underestimated. Simple measures exist to reduce user vulnerability. Examples are taking particular care of those employee accounts that are under the computer's control, rotation of personnel and analysis of management information to see if there are any symptoms of irregular work habits that might either give rise to or explain computer crime.

The Cookie Jar

A gambling debt, a drug habit or sudden investment losses may motivate an employee to view funds represented in a computer system as a solution to the problem. As though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dipping into a cookie jar, the criminal may try to take what he needs from the computer system.

In such circumstances, the motivation is much more pressing than the observation of a loophole in system security. In a more general study of white collar crime, "situational pressure such as a debt or loss" was recognized as a major component of criminality ("A Surprising Profile of the White Collar Criminal" by W. Steve Albrecht and Marshall Romney, *Prosecutor's Brief*, September-October 1979).

This finding is consistent with those of Donald Cressy, whose classic study of the factors leading to embezzlement indicated that a financial problem was frequently involved in the motivation leading to these violations of trust. Case histories of computer crimes bear out this premise.

A head teller at a New York City bank was found to have stolen $1.4 million when his bookie was raided and it turned out that he was betting up to $30,000 a day. In Denver, Colo., a man financed numerous gambling trips to Las Vegas by falsifying the input to the computer of the stock brokerage firm for which he worked.

As the control of a company's assets is increasingly relegated to computerized systems, it is not too surprising that more employees in financial need will attack the computer. "It's quite simple," James Barko of the FBI tells agents he is training to fight computer crime. "Thieves go where the money is."

Preventive Measures

To counteract need-motivated computer crime, pre-hiring investigations, within the limits of privacy law restrictions and Equal Employment Opportunity regulations, as well as economic common sense, are good preventive measures. But situations change, and security must be dynamic and responsive to these changes.

Ideally, the relationship between employees and their supervisors and management is such that the employee will seek out their help when a problem arises.

Accepting this as a goal and communicating it to all employees will itself have some effect. Provision for counseling, leaves of absence and company loans may be cost-effective as long-range security. But many troubled employees will not voluntarily seek help. Management information about minor irregularities in performance, excessive absences, lateness, unauthorized phone use or sudden changes of habits may allow intervention before need turns into cookie jar computer crime.

The War Zone

To some, the computer environment is not the source of a solution to life problems but a symbol of their cause. Disgruntled employees, feeling management is out to get them — or that they have already been hurt unfairly by their employers — may express their resentment with attacks on the company through its computer. It is as though the attacker felt in the midst of a battle. The computer environment is a war zone, or the field of employer-employee battle.

In addition, the widely held antipathy toward computers which makes accounts of computer crime so popular, and lends support to any glorification of computer criminals, provides a built-in rationalization for anyone who chooses to commit a computer crime. Rationalization is often an important component of the motivation to commit a crime, computer or not. Thus the conclusion that "they're out to get me anyway" is convenient for a person intending to commit a crime.

In Sacramento, Calif., three employees of the State Department of Justice, apparently disgruntled over the amount of their pay raise, pled guilty to deleting certain arrest records from the state's criminal justice record-keeping system. There are numerous tales of computer library tapes erased, misfiled or mislabeled; instructions to erase all company records two years after a certain programmer is fired; and even employees attacking the computer with sharp instruments, screwdrivers and guns.

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(Continued on In Depth/20)

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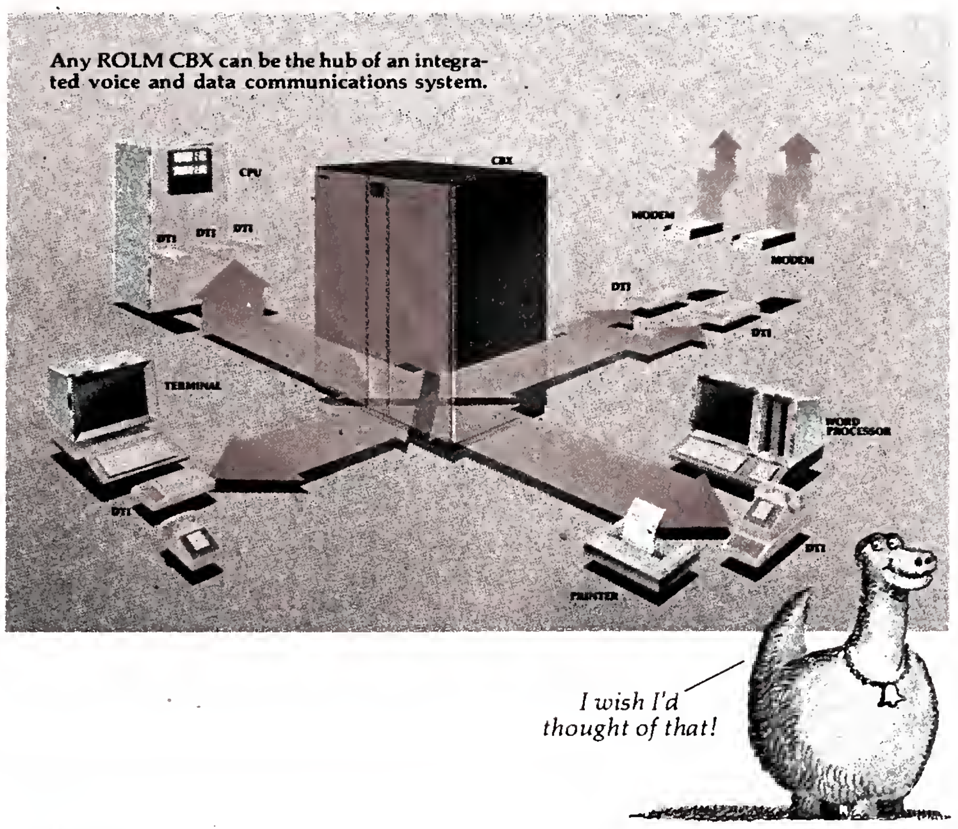

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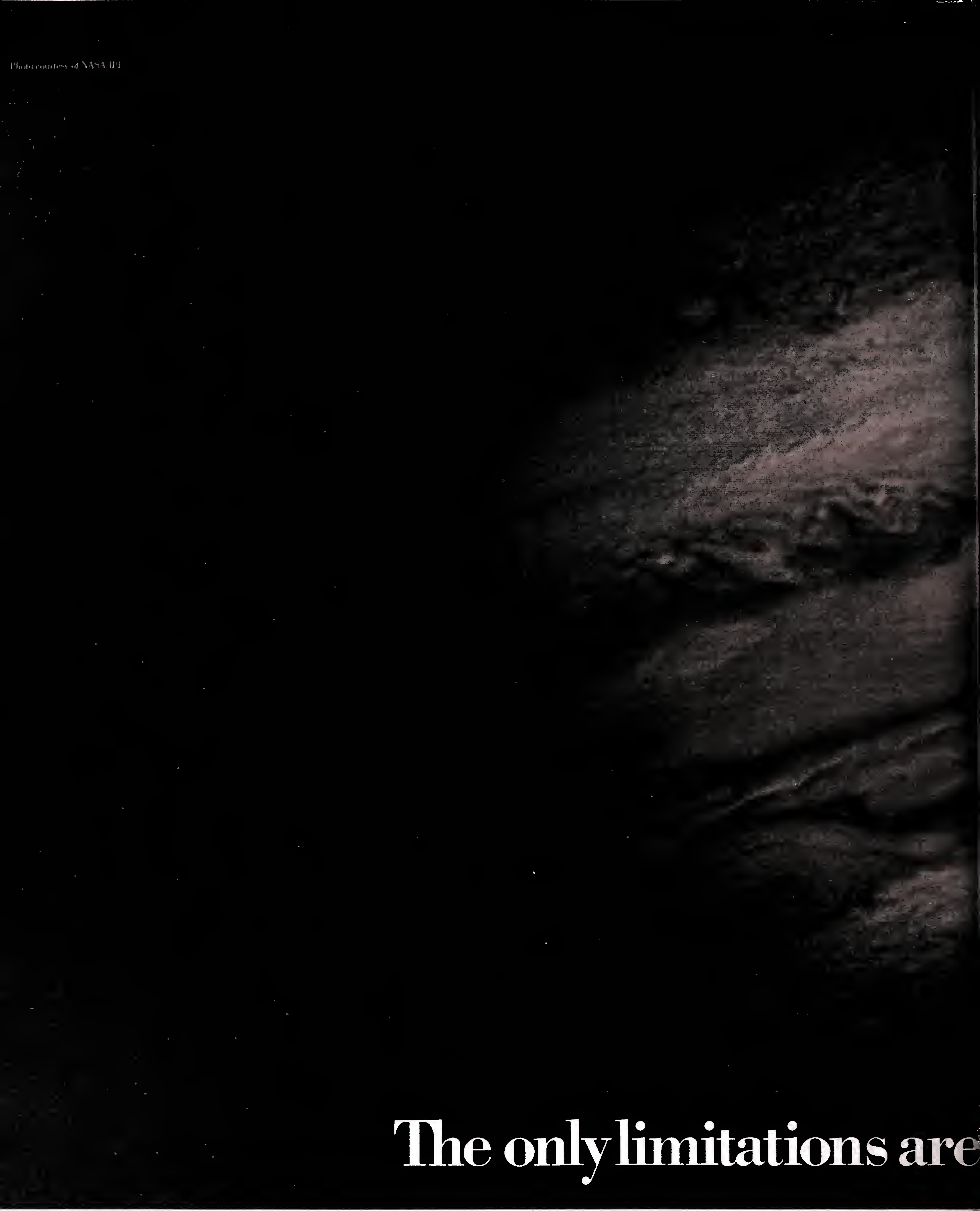

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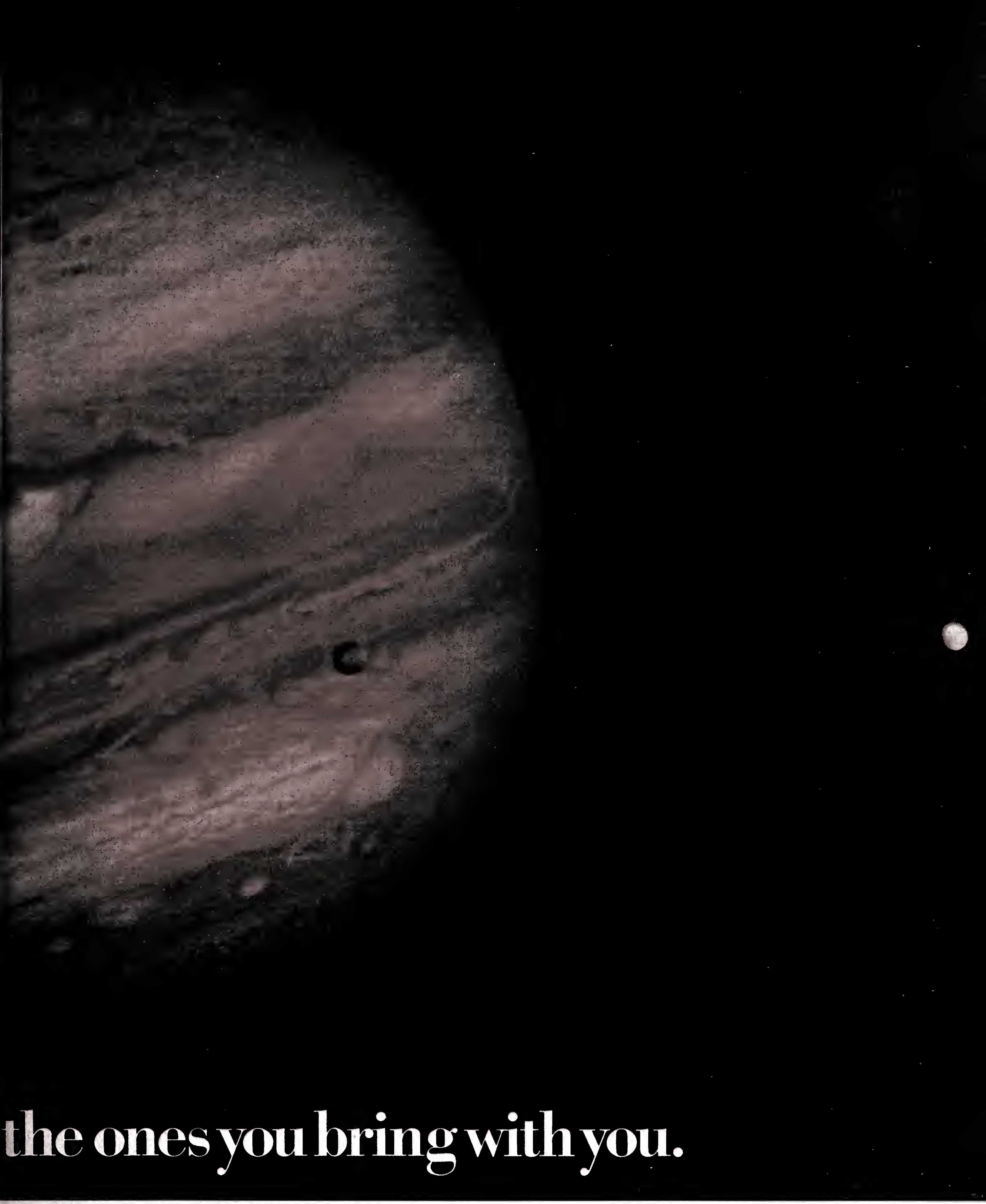

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(*Continued from In Depth/17*)

cases, an employee of a large produce company, feeling cheated out of a substantial pay raise by his employers, created a shadow corporation just like the real one, but about .75% less efficient. It was more vulnerable to theft, spoilage and so forth. All the differential between the shadow corporation and the real corporation went into the pockets of the disenchanted employee.

As in the case of the cookie jar, good management is the best prevention for this sort of attitude. Where there are no acceptable avenues to express resentment toward the employer, it should not be surprising when unacceptable avenues are used instead. Not only does an opportunity to express grievances promise to defuse at least some of these complaints, it also is a useful device to indicate which employees are most in need of attention.

This attention need not be of the cloak-and-dagger surveillance type, but can simply consist of a sincere effort to communicate more deeply with the employee and to understand the underlying resentment. Frequently a supervisor or someone in the personnel department can provide a strategy whereby the employee's resentments toward the company can be turned around, or the employee can be convinced that it is not in his interest to continue in the job. Clearly any attempt to use employee grievance meetings as a device to pressure employees into self-disclosure or into leaving the firm is doomed to failure.

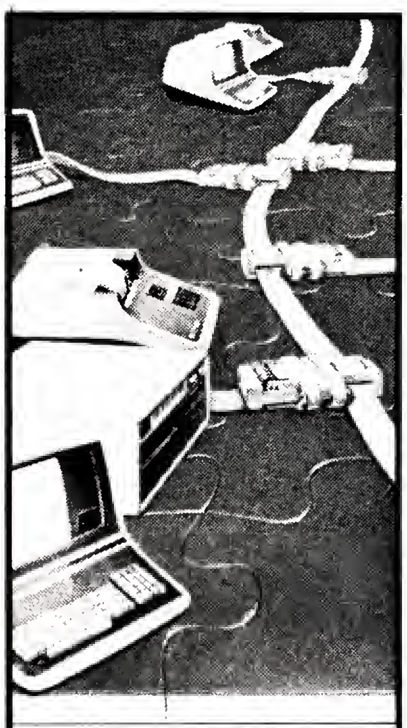
There is also the possibility that the employee's resentments are well-founded. Corrective action will not only reduce the threat of the resentful employee, but also demonstrate to all employees the folly of a war zone perception.

To the extent that employees feel a stake in the security of their company, they will help prevent war zone-type computer crimes. For example, a recent case in Houston involved an employee who, just before leaving Western Geophysical Co. of America, erased 1,000 computer files used daily by other employees. It cost the company at least $50,000 to reconstruct the data files.

How much extra work did it mean for those employees unable to access the erased files? Communicating such concerns to company employees is likely to encourage their cooperation in a computer security program and is certainly much cheaper than reacting after the files have been erased.

The Soapbox

Unlike those individuals who identify more closely with the computer than with its owner, some computer criminals find the machine itself anathema and see computer crime as a way to strike out against it. They



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envision a war in process, not necessarily between the employer and themselves, but between any of a number of different forces and themselves.

The 1960 slogan "I am a human being; do not fold, staple or mutilate" has at times been converted into an unreasonable dislike for the computer itself. In one case, a programmer sabotaged a computer by short-circuiting its memory. He told the police he had an overpowering urge to shut the computer down. Similar examples relate attacks on computers with guns, screwdrivers and bombs.

Even otherwise respectable media personalities get into the act. Matt Seiden, a columnist for the *Baltimore Sun*, recently wrote an article in the *Los Angeles Times* entitled "A Humanoid Wages War on the Computer Blob."

In the article, Seiden wrote about the travails of a reporter whose stories got lost when the newspaper's word processing computer system went down. A computer system controlling the Baltimore Convention Center malfunctioned, emitting smoke alarms of ear-splitting intensity. Pushing aside a technician who was attempting to solve the problem, Seiden's hero (a Mr. Beckerle) took a heavy steel tool, four feet long and used for bending pipes, and began smashing a metal computer circuit box attached to the control room wall. After the box was open, he ripped out wires until the alarms were silenced.

Seiden concluded: "Some center employees think that Beckerle acted rashly and with unnecessary, even irrational, violence. But I can understand exactly, and I say, 'Bravo!' "

Although Seiden's story can be dismissed as a typical computer crime of passion, the implications of the attitude he expressed are far more serious.

A New York group calling itself TAP circulates a newsletter, which in its January-February 1980 issue featured an article entitled "Computing 4 the Masses: A Devious Approach" by A. Ben Dump.

Explaining why detailed instructions are given on how to get free access to a computer and how then to use that access, the article states: "It's your American duty to go out and consume some of this awesome amount of unused computer time since nobody wants to pool it as a computer utility and make it available to everyone because it would probably not make a profit."

The article goes on to say, "This information is provided for informational and educational purposes only, since the Feds have made it a major crime (like five years and $10,000 or more) to [tamper] in ANY way with any government computer."

Terrorist bombings may reflect a much more extensively developed symbolism.

In Italy, the Red Brigades produced a telling document, "Resolutions of the Strategic Directorate." It depicted increasing computerization in Western countries as part of a sinister plot to "maximize social controls." Because computers are instruments for the "repression of the class struggle . . . it is important to attack, unravel and dismember these networks of control," the "Resolution" stated.

Last June, *Datamation* reported that terrorists had sabotaged computers in the German Federal Republic, France and the UK, as well as Italy. The French suffered attacks at computer installations operated by Air France, Philips Data Systems and CII

(*Continued on In Depth/22*)

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(Continued from In Depth/21)

Honeywell Bull. A bazooka attack on the French Transport Ministry computer center failed when terrorist rockets missed the sixth-floor computer suite, hitting the fifth-floor library instead.

Two French groups, the Comite Liquidant ou Detournant les Ordinateurs (Clodo) and Action Directe claimed responsibility for the Philips attack. The police gave Clodo the nod as more likely to have succeeded. In a statement to the French press, Clodo said, "We are workers in the field of DP and telematics. The computer is the favorite tool of the dominant. It is used to exploit, to put on file, to control and to repress."

Where the computer symbolizes one's personal frustrations, the security measures to deal with the problem are not much different from those called for in the war zone. But soapbox crimes are as likely to be committed by nonemployees as by dissidents within the users' ranks. Whether isolated individual acts or those of well-organized groups, these sorts of attack on the computer point up the need for attention to physical security. The common practice of making the computer center a highlight of a public relations tour is thus a questionable risk.

Datamation has reported that in response to European terrorism, banks are moving their data processing centers away from big cities and adopting a perimeter fence approach instead of having entrances right from the street. Distributed processing is seen by some as another security strategy.

In some situations, intelligence operations — or at least a good liaison with the ongoing information-gathering efforts of others — may be cost-effective long-term antiterrorist insurance.

The Fairyland

If any category of computer crime completely belies the major myth, this is it. Some of the participants in computer crime appear to act as if the computer environment were totally divorced from reality. A wire transfer operator may routinely transfer millions of dollars from bank to bank without recognizing how important each transaction is.

A knowledgeable source suggested that Patricia Ferguson, Stanley Rifkin's associate who pled guilty to the attempted theft of $50 million, did so simply out of her affection for Rifkin and not because she had any motivation to commit a computer crime.

In *Computer Capers*, Thomas Whiteside tells of a fraudulent transfer of $2 million. The culprit convinced his girlfriend to transfer this amount to his bank in New York, telling her he wanted to play a joke on a computer operator friend at that bank. The friend and the money disappeared before the girlfriend realized that she had been conned as well as jilted.

Enormous Risk

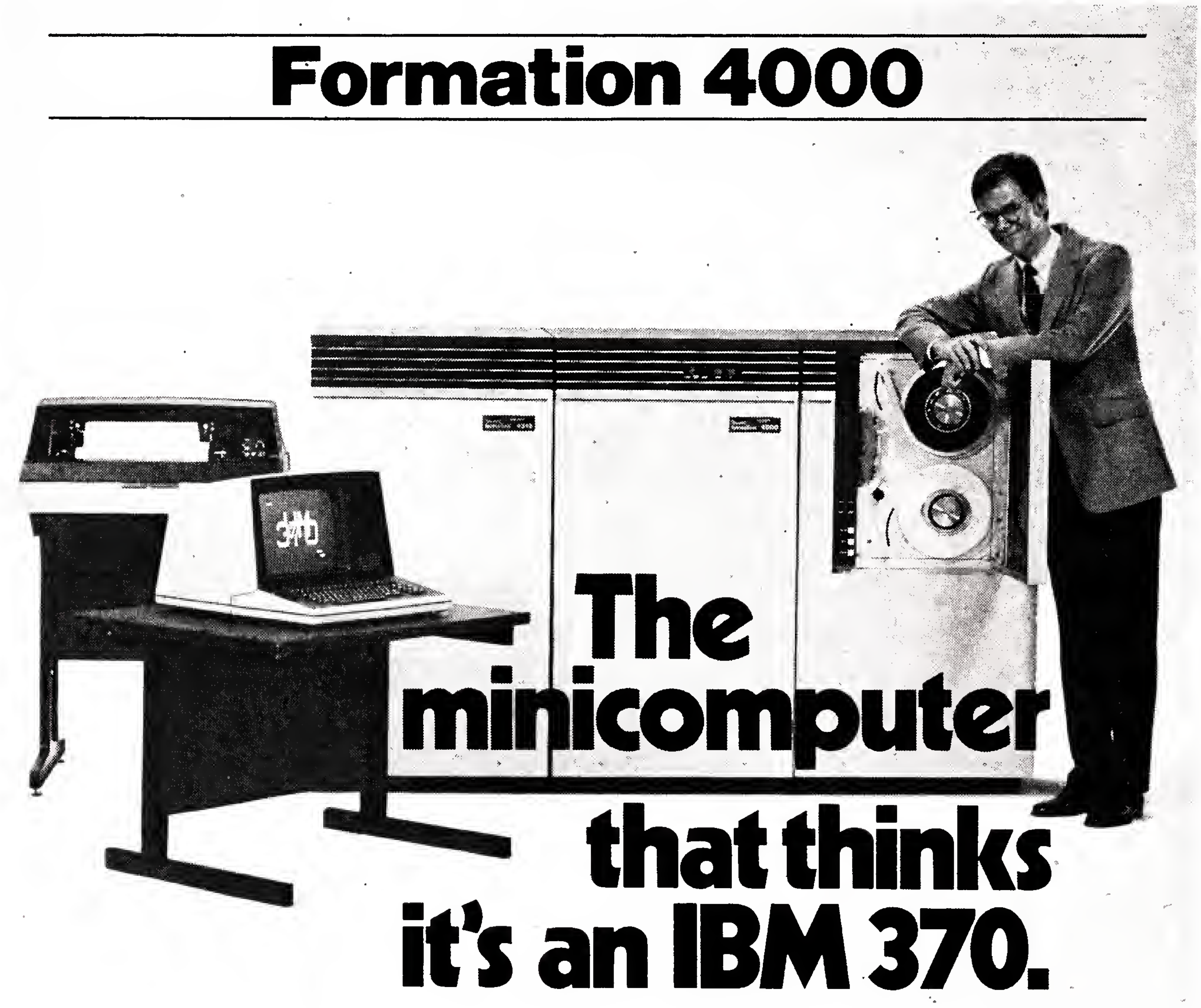
Although it is perhaps most dangerous to take assertions of ignorance at face value, since they are the most clearly exculpatory, the message behind these cases is quite clear. When employees associated with computer systems are unaware of their power and act as if there were no danger of computer crime, a company is exposed to an enormous risk.

Just as management cannot afford to ignore the new vulnerabilities a computer creates in any business, so it cannot afford to have employees who are ignorant of these vulnerabilities. Clear communication of the responsibilities of the job, as well as clear standards for its performance, are the most obvious management tools to combat this problem.

Without unduly educating employees about those aspects of computer security that are best kept secret, the company should nonetheless make it clear that each employee has a stake in computer security. Ultimately every employee of the user organization should be given an opportunity to have at least a nodding familiarity with the operations of the computer.

The other side of the fairyland mentality is that even if the employee's ignorance of computing does not facilitate a crime, it may stand in the way of that employee's detecting early warning signals that might point to a potential crime. One of the im-

(Continued on In Depth/26)



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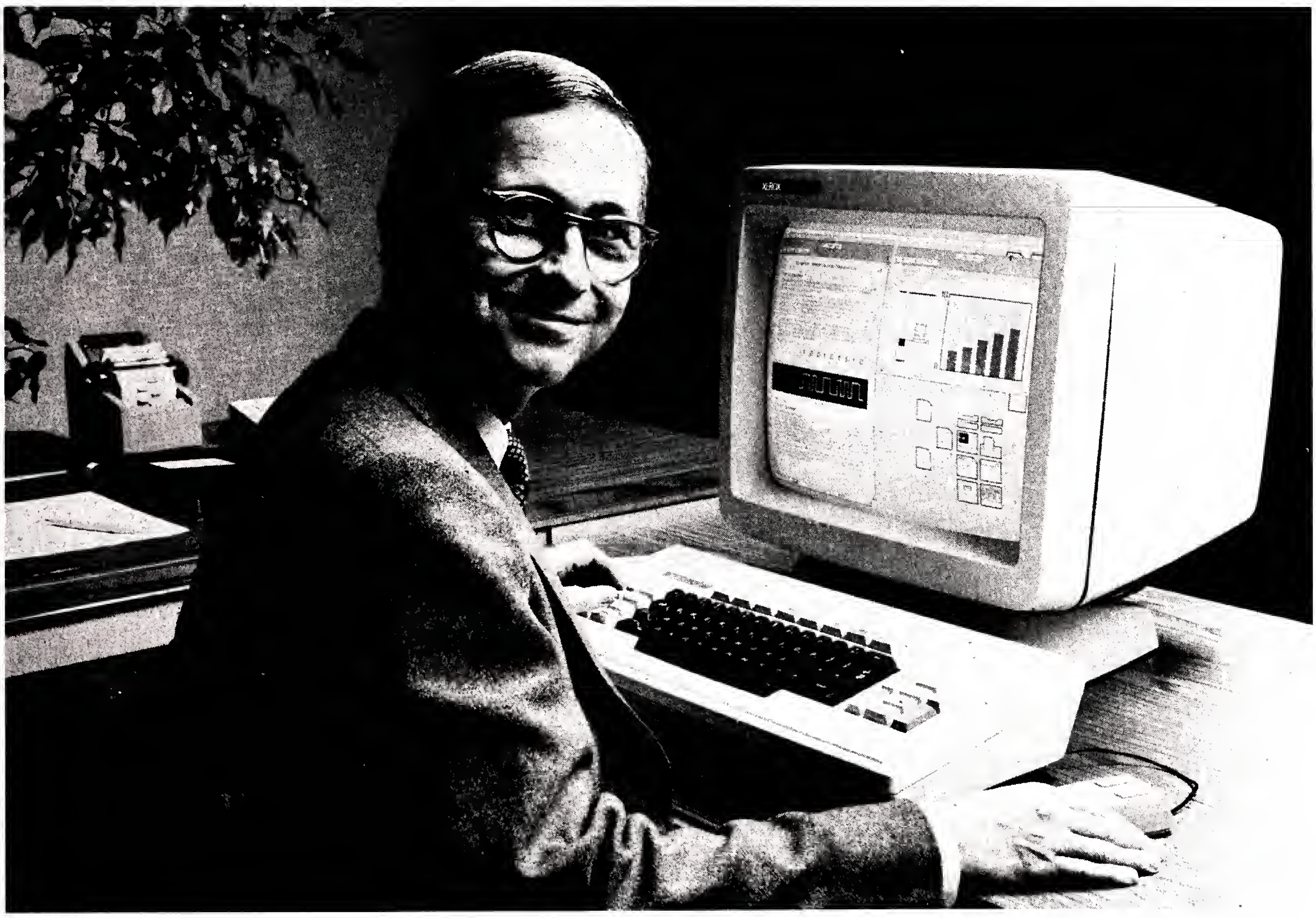

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(Continued from In Depth/22)

portant security devices in a manual system is the fact that lots of people see each piece of paper, and they can tell unusual entries just because they run counter to their common sense. To some extent we lose this security advantage when systems are computerized and no longer as easily understood by many personnel.

If we could only get the game fanatics to teach the residents of fairyland about computing, both might develop more realistic perceptions of the computer environment.

The Tool Box

To some computer criminals, a computer is simply a computer. Thus, we have cases of computer crime where the computer is not the target but the implement of a crime that in no other way involves computing.

The TAP newsletter almost waxes rhapsodical about computer-assisted freaking. A. Ben Dump noted: "The infamous computer 'Charlie' was used to dial 800 numbers and scan for Wats extenders. I'm designing a system now that will automatically scan for computer dialups, test them for data rate and possibly even attempt access. Having a computer as an assistant is the most creative way to go about this."

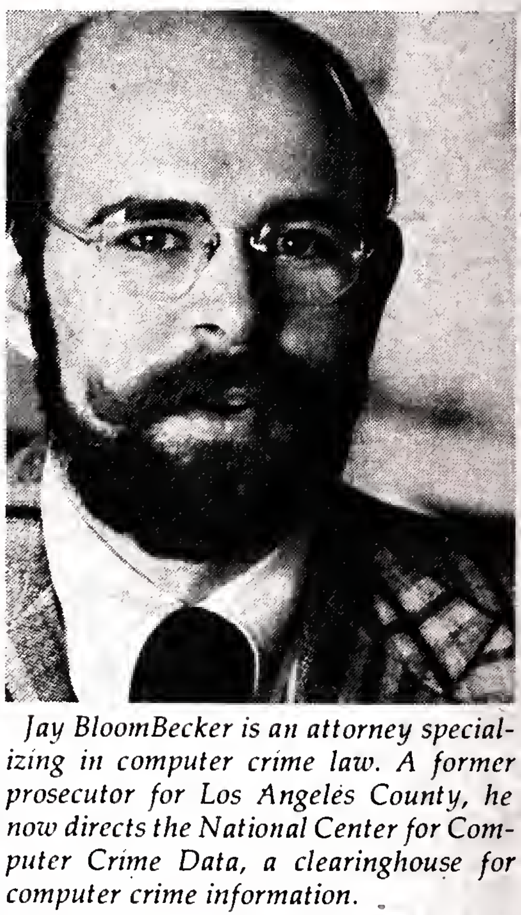
The Equity Funding personnel who used computers to create false insurance policies by the thousands seemed similarly clear-headed about what a computer can do. But perhaps the most ludicrous example of this type of criminal is the Los Angeles brothel owner who used a minicomputer to keep track of his customers.

These examples suggest a type of computer criminal we can call the "technological crook." This is someone who views the computer as a powerful machine and is more likely to already be a criminal than any of the individuals whose attitudes have been described previously.

Since the key to this sort of crime is computer use, strategies that limit access to the computer are the most important security. Some common measures include:

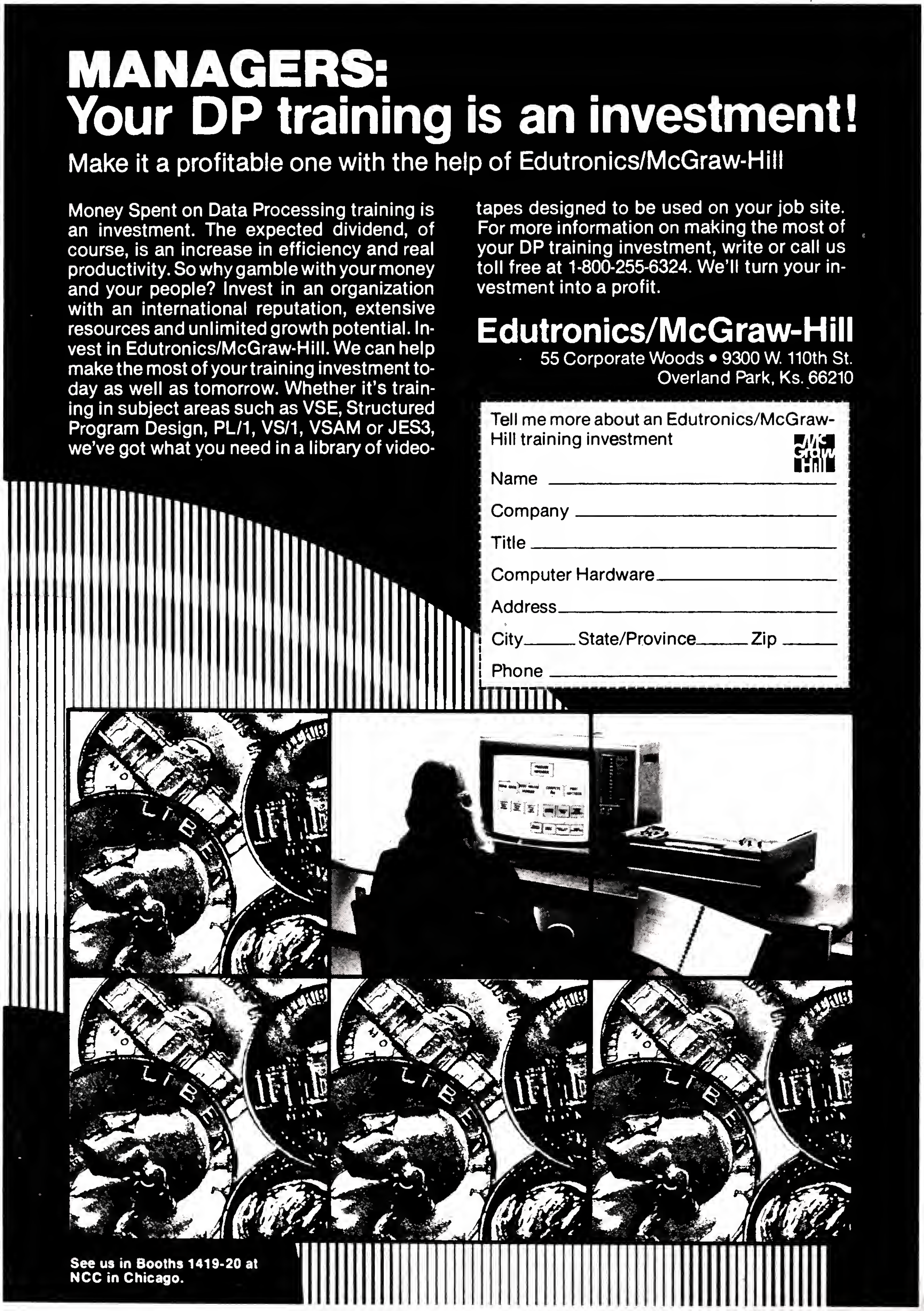
- Careful logging of those activities for which the computer is used.
- Separation of operator and programmer functions wherever possible.
- Rotation of assignments so that it is harder to keep system abuse secret.
- Communicating as clearly as possible the company's expectation that computers will not be used for people's personal projects.

The categories listed here may be of little use in predicting a specific individual's criminality. But if the computer environment looks to the user like a playpen, a cookie jar or any of the other models I have discussed, we can assume it will appear that way to some would-be computer criminals as well. In any case, by applying some of the security strategies outlined here, we should be able to help keep honest people honest and make it a little harder for criminals to perpetrate crimes.



Jay BloomBecker is an attorney specializing in computer crime law. A former prosecutor for Los Angeles County, he now directs the National Center for Computer Crime Data, a clearinghouse for computer crime information.

BloomBecker has written and spoken widely about computer crime. His published work includes a book, The Investigation of Computer Crime *(U.S. Department of Justice, 1980, available from the Government Printing Office), articles in England's* New Scientist, The Los Angeles Lawyer *and* Security World, *book reviews and editorials.*



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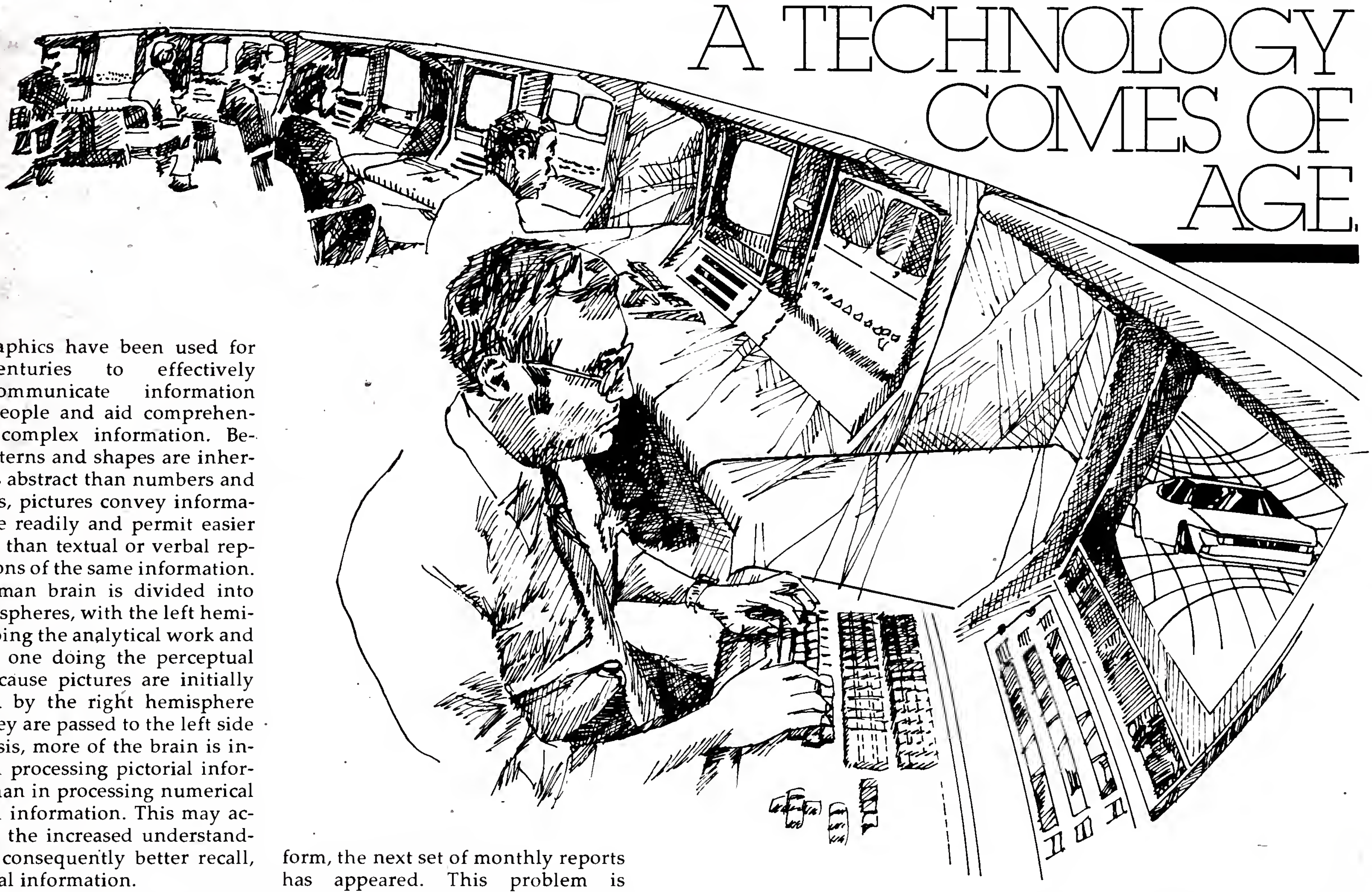

Graphics have been used for centuries to effectively communicate information among people and aid comprehension of complex information. Because patterns and shapes are inherently less abstract than numbers and languages, pictures convey information more readily and permit easier retention than textual or verbal representations of the same information.

The human brain is divided into two hemispheres, with the left hemisphere doing the analytical work and the right one doing the perceptual work. Because pictures are initially processed by the right hemisphere before they are passed to the left side for analysis, more of the brain is involved in processing pictorial information than in processing numerical or textual information. This may account for the increased understanding, and consequently better recall, of pictorial information.

There is an extremely important distinction between information and data. Data is essentially raw material from which information is obtained, while information is knowledge or meaning extracted from data. The reason for stressing this distinction is that pictures tend to communicate information, while text; and especially that which contains numbers, tends to communicate data *from which information may be derived.* This introduces an extremely costly step: A human being must process the data in order to obtain information.

This is Part 1 of a two-part article on computer graphics.

Too Much Data

The problem is compounded by the computer. Stories abound concerning the alleged "information overload" from using computers in business. But anyone who has stared at a stack of computerized monthly reports knows the problem is not having too much *information*, but rather too much *data*.

By the time a person has extracted the pertinent information from the data and put it into some meaningful form, the next set of monthly reports has appeared. This problem is known as "information float," that is, the time lost between when information becomes available and when it can actually be used.

This is the major cause of efficiency loss for today's information systems user. A person's most valuable asset is time, and time spent processing data into information is wasted time.

Dual Solution

Computer graphics provides a solution to both the data overload and information float problems. Since most data is computer generated, computer graphics becomes almost essential for extracting and presenting meaningful, pertinent information from large volumes of complex data. In fact, it may be the only viable means of enabling a person to quickly identify relationships, trends and exceptions, which are frequently embedded in masses of data.

Computer graphics can also present information in a concise and visually interesting form, which often facilitates the decision-making process. Visual interest is often derided or attacked as frivolous, but people make better decisions when situations and information are interesting. And no one will deny that graphics is more interesting than straight text.

Computer graphics also facilitates the investigation of alternatives and in fact encourages the "intuitive leap." One of the earliest interactive graphics applications in which I was involved was brought to me by a biologist who was attempting to define a set of initial conditions that would allow two populations of different organisms to coexist in a controlled environment. His intuition told him it was possible, but he was unable to verify it with his computer model.

We wrote a package that converted his numerical data into a graph. The biologist found a hump in the curve displayed on the CRT. He couldn't understand why the hump was causing the problem at first, but having made the intuitive leap, he pressed on. In about an hour's terminal time, he solved the problem, which had been plaguing him for four weeks.

Visualizing Change

Computer graphics provides an effective tool for observing trends and exceptions. A set of figures can show increases or decreases, but a histogram, for example, can show the *rate of change* of increases or decreases.

Further, a table presents only data, which must in turn be analyzed by the user for its information value. The information may or may not be accessible. A graphic, on the other hand, presents information. The user can draw analyses and conclusions much more readily. This can become a critical factor when dealing with large amounts of data.

All these techniques have been well-known and applied in computer graphics for many years. Yet they have only come of age in the past two to three years. Why?

Prices are down. The threshold cost of utilizing computer graphics is an order of magnitude lower than it was several years ago.

The technology has matured. With the advent of the microprocessor, large, inexpensive memory, increased reliability of local storage media such as floppy disks, improved architectures and advances in raster technology, intelligent graphics terminals with significant storage and computing capabilities are now widely available.

People are now using computer graphics, rather than just designing elegant systems. In addition, graphics systems designers have discovered users and are starting to appreciate their importance. Not only do graphics systems have to be used, but they also have to be used by people, many of whom are not computer-ori-

(Continued on In Depth/28)

by Timothy K. Dudley

(Continued from In Depth/27)

ented (nor should they need to be). Users are primarily interested in what technology can do for them, rather than how it is accomplished.

Designers of graphics systems are beginning to understand how to deal with graphics information. Their experience is improving both designs and applications. As a result, systems are much more effective.

Graphics applications in business and financial areas are growing in number. The primary motivations for this are reduction of information float, mentioned earlier, and reduction of paper-handling. Managers can thus analyze, digest and act on more information than ever before, which in turn results in faster and more accurate decisions. And finally, those who allocated and approved money for acquiring graphics capability are at last able to receive some direct benefits.

Tight money has forced a close look at justifications for the graphics acquisitions, and the technology has justified itself. Computer graphics is finally being perceived as a productive tool, not just an expensive toy.

New Age of Graphics

Computer graphics has finally come of age. It is a highly visible, highly active, rapidly changing technology and is having a greater effect on business and science than ever before. Some graphics technologies are better suited to certain applications than others. Managers must understand the differences so they can properly evaluate vendor offerings and choose computer graphics systems suited to their needs.

The remainder of this article will examine the three most widely used technologies: their strengths, weaknesses and associated costs, as well as their relative applications. In addition, it will deal briefly with interactive input devices and hard-copy output devices and their associated costs. We'll examine the general state of computer graphics software including the motivations for and the attempt at device independence, plus some "general-purpose" application packages. Finally, the article will touch on evolving trends in the computer graphics area and look at the impact of these trends on business, science and society in general.

Since most data is computer-generated, computer graphics becomes almost essential for extracting and presenting meaningful, pertinent information. In fact, it may be the only viable means of enabling a person to identify relationships, trends and exceptions quickly.

Historical Perspective

In the early 1950s at MIT, a CRT was connected to the Whirlwind 1 computer and used to generate simple pictures. However, because of the noninteractive nature of computers at the time, computer graphics made little progress until 1962, when Ivan Sutherland at MIT published his Ph.D. thesis entitled "Sketchpad: a Man-Machine Graphical Communications System." This document is generally considered the starting point for computer graphics.

The system's screen was very small (approximately 10 inches diagonally) and required an entire host to run the system, as all calculations for picture transformations apparently had to be done on the fly. However, the important aspect of Sutherland's thesis was that it clearly demonstrated the feasibility of graphics communications between man and computer.

The 1960s were an affluent time, and computer graphics research flourished. Large research projects were mounted at both educational and corporate institutions. They explored the interactive graphics capability in architecture, building design, mechanical design, simulations and other large complex scientific applications.

During this time, little attention was paid to the user interface, as the majority of effort was concentrated in producing elegant systems and extending the technology. This lack of attention caused a severe setback in the early 1970s, because technological development was far outrunning

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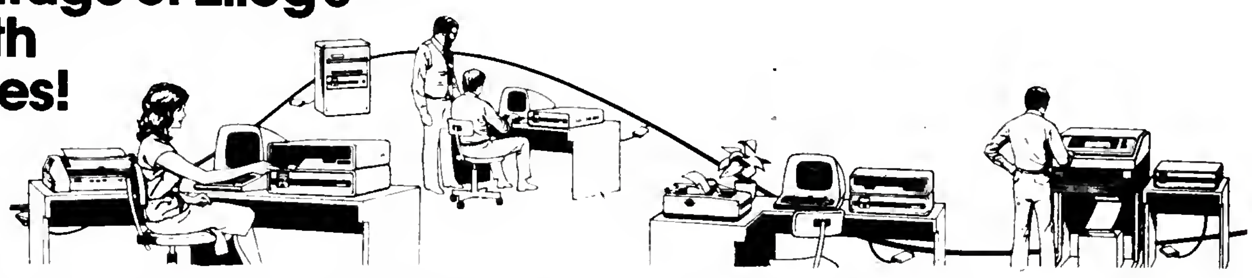

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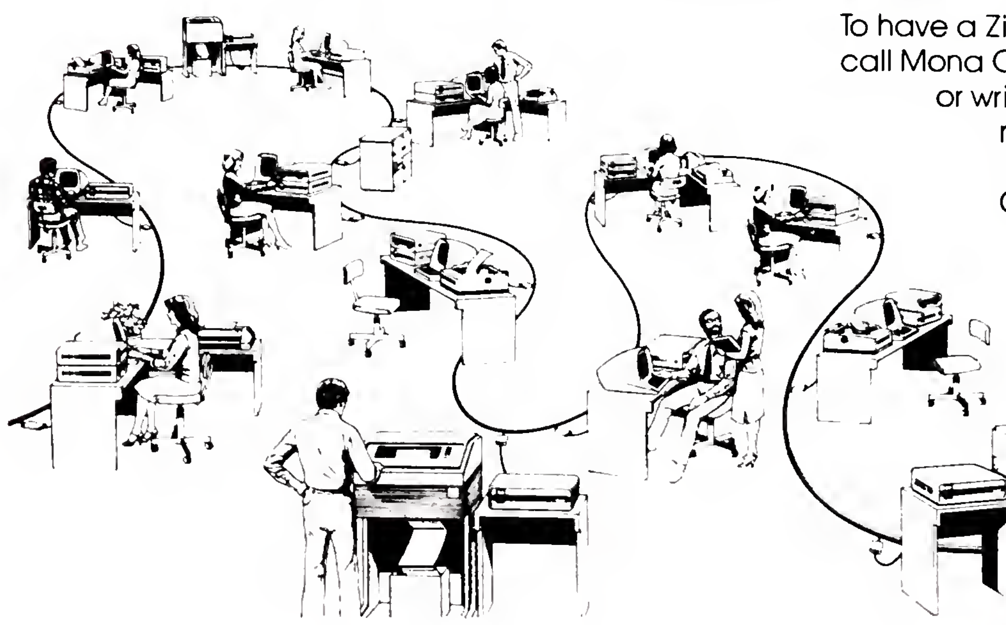

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actual application. As a result, a significant credibility gap appeared between the technology and its perceived usefulness.

The potential of computer graphics was so obvious to the people working in the area that they neglected to explain or justify it to users.

Articles discussing how computer graphics had finally matured began to appear, and in 1973 the Battelle Seattle Research Center sponsored a symposium entitled "Why Is Computer Graphics Always a Year Away?" The question wasn't specifically answered at the symposium, but it was becoming obvious, even to the graphics people, that the technology was in danger of outrunning its potential customer base. Some serious effort was in order to ensure that computer graphics became useful as well as beautiful.

The effort was indeed made. Graphics people took the time and trouble to increase user awareness. As they became more proficient with graphics systems, the technology changed to meet their needs and requirements. As technology improved, costs and prices came down, making the equipment available to more. All these factors have finally brought computer graphics into maturity.

The Technologies

Part of the confusion and misunderstanding surrounding this field results from using different terms to talk about the same things. Consequently, some definitions of terms used in this article are in order:

- *Computer graphics* refers to computer-generated pictures.
- *Interactive computer graphics* are those drawn on the face of a terminal screen, as opposed to hard copy.
- *Hard copy* denotes graphics drawn on paper, vellum, film and so on.
- *Resolution* describes the number of addressable points on the terminal screen, typically by quoting the number of points in the X direction, then the number of points in the Y

(*Continued on In Depth/32*)

A Colorful Future

A recent report by Merrill Lynch Pierce Fenner and Smith estimated a 1984 sales target for the computer-aided design/computer-aided manufacturing (CAD/CAM) industry to be $2.2 billion. It went further to state that this industry has not been affected by the 1980 recession and that "growth in 1980 has far exceeded our expectations of one year ago . . ." Another report from the First Boston Corp. estimated the 1990 computer graphics market will be $8.5 billion, with less than 20% market penetration.

IBM has announced a small color graphics terminal, and currently placed orders are estimated to be between 50,000 and 100,000.

After only 26 months, a major CAD/CAM supplier was sold for just over 10 times its purchase price, and a smaller CAD/CAM supplier realistically expects to double its revenue between 1981 and 1982, from $17 million to $35 million.

Ford Motor Co. is in the process of developing a computer graphics network for between $30 million and $40 million.

The computer graphics industry is expected to experience a 40% annual growth rate for the foreseeable future. With the industry growing as rapidly as it is, and with its apparent immunity to economic recession, it is becoming increasingly important for managers at all levels to appreciate the potential impact of this technology on their business and on businesses and society in general. In order to appreciate this impact, however, it is necessary to understand something about the technology itself and the difference between information and data.

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(Continued from In Depth/29)

direction.

Several areas of computer graphics are encompassed by the general term, and they need to be made distinct. Pictures that are generated and manipulated by analog computers and then mixed with video signals and manipulated further are being widely used in the advertising and entertainment industry. However, that form of computer graphics is beyond the scope of this article, which will restrict itself to digital computer graphics.

To further restrict this article, the distinction must be made between image processing and graphics. This distinction was best defined at an International Federation for Information Processing (Ifip) Conference on Graphics Languages. This article is primarily concerned with computer graphics defined as **description in, image out.**

A general diagram of a graphics system is shown in Figure 1. The picture is described in a model on which the application package operates, structuring it and breaking it down into graphics primitives such as lines, points, circles and so on, which are defined in so-called "world" coordinate systems. The world coordinate system is entirely application-dependent; that is, a mapping application would likely utilize miles, and a printed circuit board application would likely be using inches or centimeters.

When the picture is displayed on the output device, it must be transformed from the original world coordinate system to a device coordinate system, which will be different for different output devices. In addition, the user may want to manipulate the picture before viewing it, performing such operations as enlarging (zooming), displaying only part of the picture or, in the case of a three-dimensional model, viewing a perspective from a particular distance and viewing angle. All these operations are performed by viewing transformations, and the resulting data is stored in a display file which contains a description of the view currently displayed.

In addition, input devices feed information to the application program through sets of input functions, which the application program may then use to modify the picture or the view of the picture being displayed.

Most graphics systems generally conform to this model. The major differences arise when distributing the application program, input functions, viewing transformations and display file between the host and the graphics system and in the actual display technology which is used to generate the picture.

The Display Technologies

There are basically three types of interactive graphics display technologies in use today: refresh, storage tube and raster. (Two others — plasma flat panels and laser displays — are not in widespread use and will not be discussed in detail.) Let's examine each.

Refresh Technology. Here the picture is drawn by an electron beam directed onto a phosphor coating on the inside face of a CRT (see Figure 2). The phosphor lights up when hit by the beam, and the picture is produced by directing the beam so that it traces the picture onto the phosphor. Because the phosphor fades quickly after being lit up by the beam, the picture must be retraced (refreshed) 40 to 60 times per second for the image to remain on the screen.

Because of this continual refreshing, this technology is most often referred to as "refresh graphics." It is also referred to as "vector refresh," "directed beam" or "random scan" graphics, with the latter term probably being the most precise because it distinguishes this type of graphics from the other two. Refresh graphics systems tend to be the most expensive of the three technologies, primarily because they require more electronics to drive them.

A refresh graphics terminal consists of a display file, display processor and CRT. The application program acts upon the display file, which in turn sends computer instructions to the display processor, telling it where to move the beam in order to draw the picture. The display proces-

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sor must execute all the instructions 40 to 60 times per second in order to keep the screen refreshed.

If the display file gets too large to be completely executed before the picture starts to fade on the screen, the picture starts to flicker, which is probably this display's most annoying characteristic. The speed with which the display file can be executed determines the complexity of the drawing that can be displayed without flicker. However, the instructions in the display file can be modified very quickly, which enables the picture to change each time the display file is executed. This can give the effect of motion on the screen and provides the ability to selectively erase picture entities merely by skipping the instructions that cause the entities to be drawn.

Storage Tube Displays. Storage tube displays operate similarly to refresh displays. The picture is drawn by a directed electron beam, causing the image to be traced on an extremely long-persistence phosphor inside the CRT. However, the beam writes on a fine mesh grid mounted just behind the phosphor-coated screen, not on the phosphor itself (see Figure 3).

The charges deposited on the grid are transferred to the phosphor by a flood of electrons from the flood gun. This means the picture is stored on the grid and, as a result, needs to be traced only once. Because it stores the image on the face of the tube, this type of display is referred to as "storage tube." It is also referred to as a "directed beam display" or a "direct view storage tube (DVST)."

Storage tubes do not suffer from the problem of flicker, but this turns out to be a mixed blessing. Because the picture is stored on the screen, it needs to be traced only once, so the only time display speed is a consideration is the first time the picture is traced on the screen. Vectors can be added until the screen is completely full and the picture will remain stable. This, along with relatively high screen resolution and low price, are the main advantages of the storage tube.

However, it is not possible to selectively erase part of the picture because of the difficulty in removing the stored charge from the storage grid. This means that while information may always be added to the picture, if you wish to delete something, the entire screen must be erased and the modified picture completely redrawn. In order to erase the screen, the storage grid is hit with a positive charge for about one second, which generates an annoying flash over the

(Continued on In Depth/34)

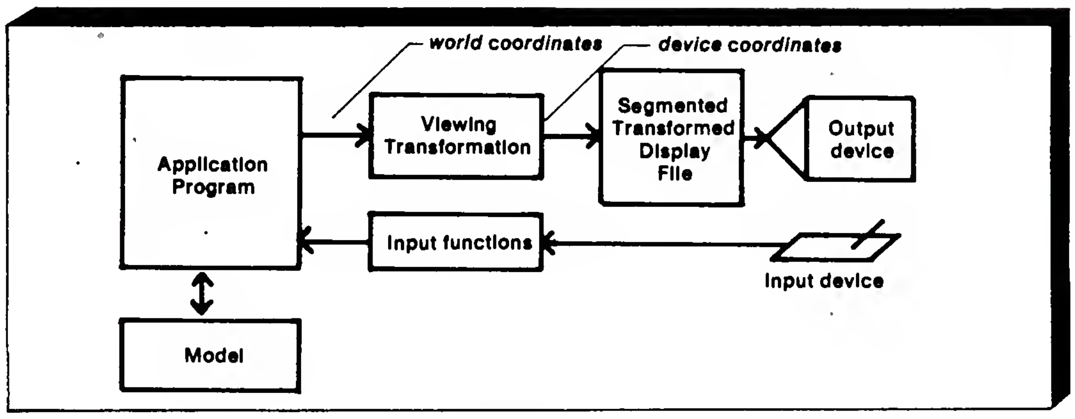

Figure 1

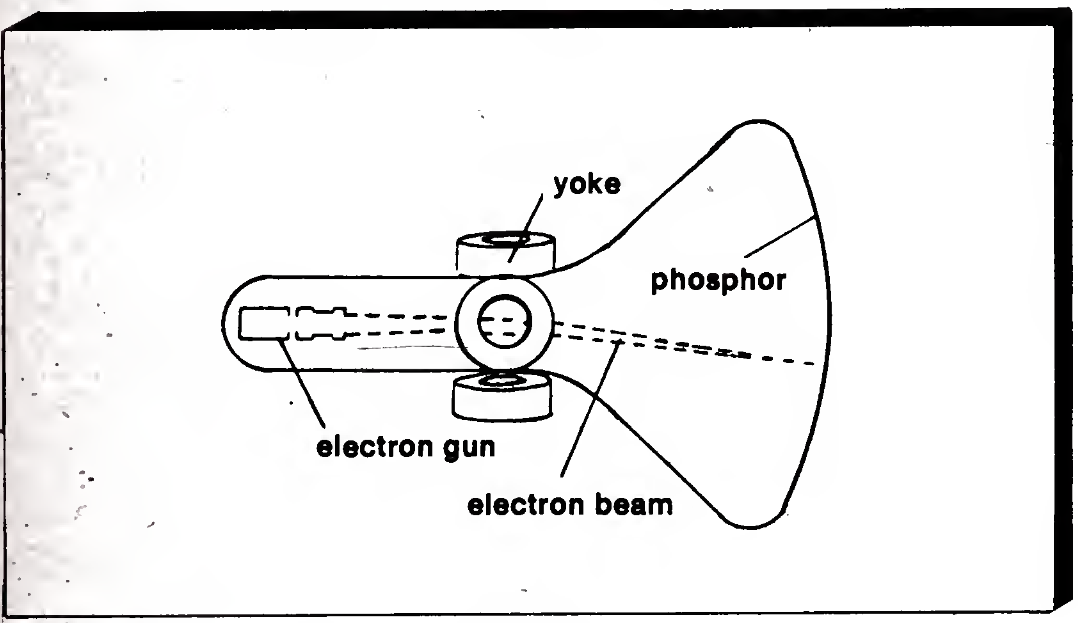

Figure 2

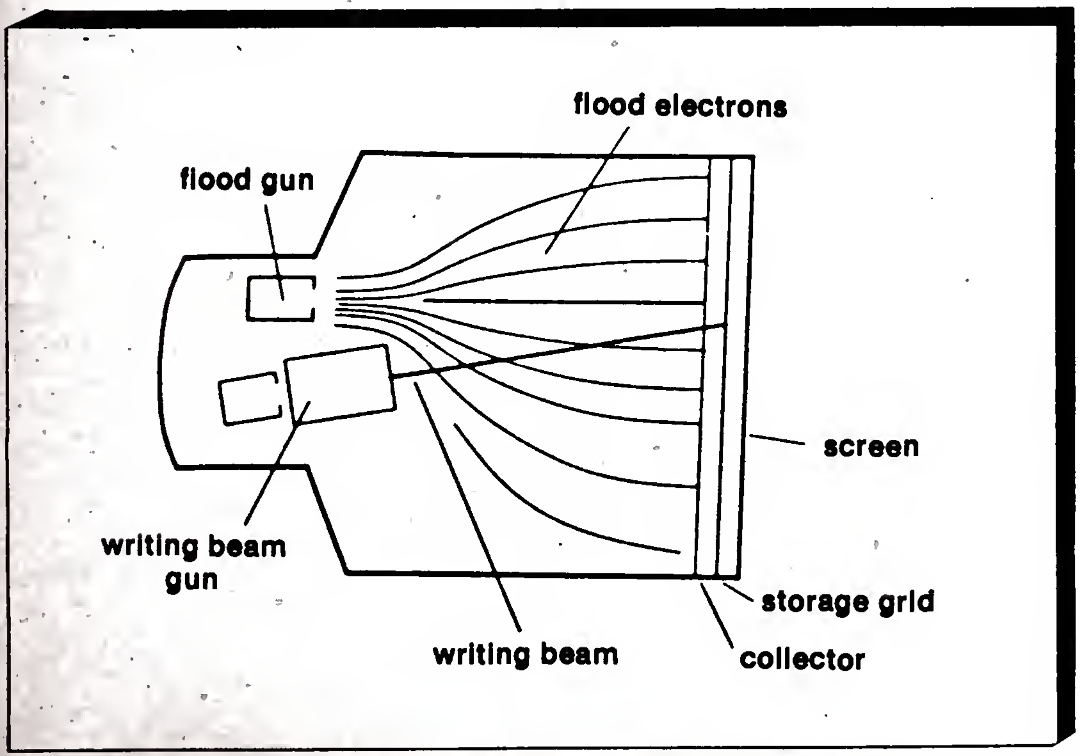

Figure 3

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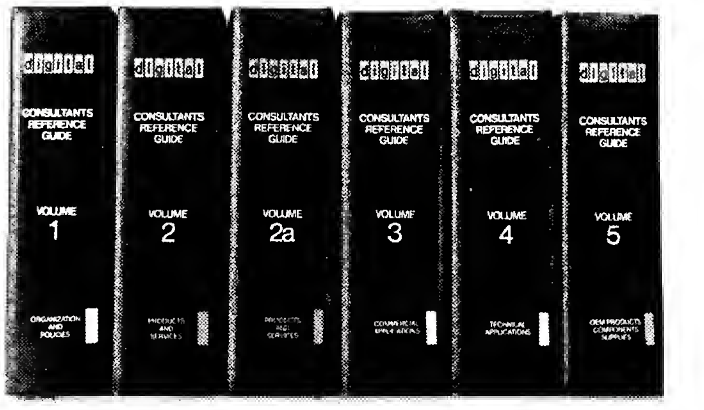

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(Continued from In Depth/33)

whole screen area.

This lack of selective erase capability, the low intensity level of normal lines drawn on the screen and the flash problem when erasing the screen are the major drawbacks of the storage tubes. In addition, storage tubes are generally capable of displaying only one level of intensity and are typically available with only green phosphors.

A storage tube graphics terminal consists of a display processor and CRT. The application program acts upon the display processor as before, however the latter is merely a box that translates Ascii character codes directly into beam movement, mode changes (alpha to numeric) and so on.

Raster Scan Display. Both previously mentioned technologies deal with line drawing displays or stroke writers. The raster scan display differs fundamentally from the other two in how a picture is displayed. The picture is stored in a "frame buffer" as a matrix of on/off bits. Each bit (or byte, in the case of displays with color or gray levels) corresponds to an addressable point on the screen. The screen is divided into equal-sized strips called "scan lines" and each strip is divided into equal-sized blocks called "picture elements" or "pixels."

The beam scans each line, controlling the intensity of each pixel by the information stored in the corresponding bits in the frame buffer. Some systems, including most TV monitors, use interlace to reduce the problem of flicker. That is, the beam scans every other scan line, using the omitted lines for a horizontal retrace, then scans the omitted lines on the next cycle. This divides the image into two separate fields, one containing the even-numbered scan lines and the other containing the odd-numbered scan lines, with the two fields comprising one frame (see Figure 4).

Typical Device

A simplified block diagram of a typical raster device is shown in Figure 5. The application program provides information to the first "display controller" (usually a microprocessor), which builds the display file. The scan converter changes the vector information in the display file to a raster format and stores it in the frame buffer, where it is scanned by the second display controller and sent to the CRT.

The raster scan display combines the advantages of both the storage tube and refresh technologies. Because beam movement is not affected by picture content, the picture description in the display file can be modified while the picture is being displayed, thereby providing selective erasure capability as well as the capability to display motion. And again, because picture complexity does not affect beam movement, the classic flicker problem generally associated with refresh-type terminals does not occur.

There is, however, another flicker-type problem associated with raster devices which results from interlacing. Each field is scanned approximately 60 times a second, which means that the entire interlaced frame is scanned 30 times a second. The phosphors most commonly used, particularly color phosphors, begin to decay or fade in a thirtieth of a second, which gives the effect of one field beginning to fade while the second field is being refreshed. This causes the picture to appear to jiggle slightly, producing the phenomenon known as "jitter," which can be extremely annoying, particularly when viewing large areas filled with bright colors.

Avoiding Jitter

There are two common means of avoiding jitter. One is to use longer persistence phosphors, but this results in the picture starting to bleed, as well as a smearing effect when the picture elements are moved.

The other is to refresh the entire frame in less than a thirtieth of a second, but this has the effect of reducing the number of pixels that can be displayed. Most color raster terminals have 512 by 512 resolution (or in that range, such as 640 by 480), refreshed 30 times a second. A few have 512 by 512 refreshed 60 times a

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second, which provides a picture with no jitter effect. Some color terminals are now being produced with a resolution of 1,024 by 780, or 1,280 by 1,024, refreshed 30 times a second, and which use slower phosphors to minimize the effect of jitter.

Increasing the resolution of color raster devices is a major area of current research in display technology, with the general goal being to produce a device that can display 1,000 lines 60 times a second. The ideal seems to be a 19-in. screen with 1,000 by 1,000 resolution refreshed 60 times a second.

Mitsubishi has just announced a color monitor with 1,800 lines and says its goal is to produce a 2,000-line monitor. This means that by duplicating information from odd scan lines to even scan lines, the device will be able to display a 1,000-line picture in one refresh cycle, presumably a sixtieth of a second. If this is the case, that monitor will be incorporated into new terminals within a year of announcement.

Generally, the higher the raster display's resolution, the more expensive it becomes. The least expensive raster systems have very limited graphics capability, based on a set of graphics characters, or "mosaics," which are used to construct pictures by placing different characters next to each other to form the completed pictures.

These displays were initially used in the early personal and home computers and for the early attempts at graphics in European and Canadian videotext systems. (Europe still uses mosaics — Canada now uses raster-scan graphics.) They produce very poor quality pictures, especially when compared with the point-to-point displays such as have been described above.

Technology Summary

Each type of display technology can be readily distinguished by its nomenclature, and each is geared for somewhat different applications, as follows:

- **Raster scan:** Uses a raster, or matrix, which is regularly scanned in a succession of scan lines. Such systems may be considered as interactive color TV sets, or TVs with memory. They have very high to high resolution and produce both static and dynamic pictures. The technology is suited to drawings of areas and surfaces and produces realistic pictures. Prices range from very low to fairly high. The systems are generally used as "intelligent" terminals.
- **Storage tube:** Stores the picture in the tube. The technology produces high-resolution, static pictures and is good for fast plotting and line drawings. The display is green on green. Such systems are medium priced and generally used as "dumb" terminals.
- **Refresh display:** Must be continuously refreshed. Such systems produce moving line drawings, dynamic pictures, with very high resolution. The display is monochromatic. The systems are fairly expensive, highly interactive and can be used as standalone devices.

Characteristics, Applications

The characteristics of each technology can determine its most suitable application. Figure 6 (on In Depth/36) summarizes all three. Each type is substantially different in its interactiveness, resolution, drawing type, motion and color — not to mention cost. Here are some typical uses that may help ascertain which is best for you.

One of the trade-offs with refresh technology is that, while the subject of flicker arises with very high-density pictures, the user doesn't need to display high-density pictures because of the highly interactive nature of the technology. He can, in fact, bring in the information as needed, rather than try to display all of it at once. These characteristics make refresh technology very well suited to anything that requires dynamic motion, such as simulations, mathematical modeling or animations.

It is also well suited to anything that requires a high degree of interactiveness. Applications such as three-dimensional engineering design, three-dimensional architectural design or possibly interior design and floorplan layouts are very straightforward with the refresh technology. A three-dimensional picture can be displayed in perspective and then rotated in essentially real time, so the user can easily visualize the object the data is describing.

With interior design, different floor plan layouts can be experimented with and easily changed using refresh technology. The main advantage of this technology is its highly interactive nature, which enables the user to explore a number of various alternatives quickly before committing himself to a specific choice. As you might guess, the user must pay for all this flexibility; refresh systems cost between $15,000 and $350,000.

Storage tubes offer an interesting mixture of advantages and disadvantages. They tend to have large screens and high resolution. The two main advantages are picture stability and reasonable price. Unit cost on storage tubes typically runs from approximately $8,000 to $35,000, depending on screen size and other op-

(Continued on In Depth/36)

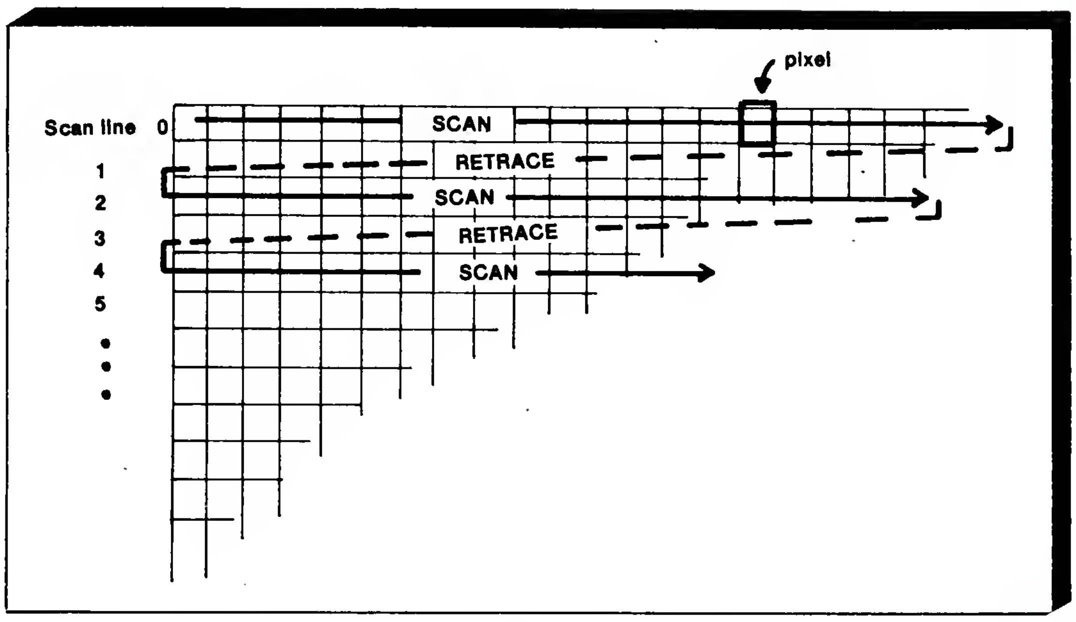

Figure 4

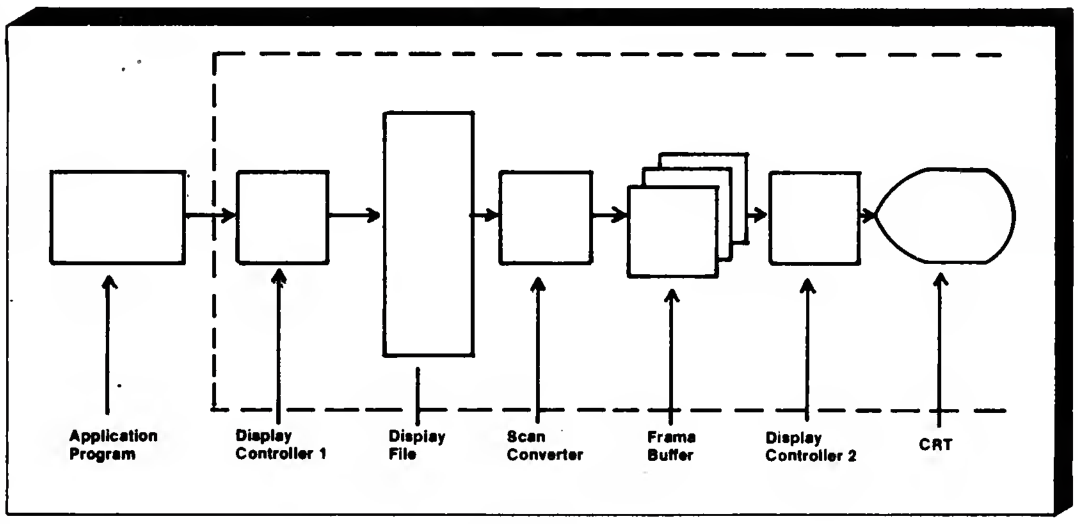

Figure 5

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(Continued from In Depth/35)

tions available with the terminal.

Picture stability is good since the picture is drawn right on the face of the screen. Once it is there, it doesn't have to be redrawn every thirtieth or sixtieth of a second.

In addition, storage tubes have fairly high resolution, nominally 4,096 by approximately 3,800, but in fact a visible resolution of about 1,000 by 780. This combination of high resolution and static display makes the storage tube well suited for applications that do not require a high degree of interactiveness.

Storage tubes have several disadvantages. Because they lack selective erase capability, they tend to get quite cluttered, or else the overall picture is repainted too many times. This repaint time isn't a problem with pictures that aren't particularly dense, such as management information applications. However, for printed circuit boards, complex maps and block diagrams, the repaint time becomes quite significant.

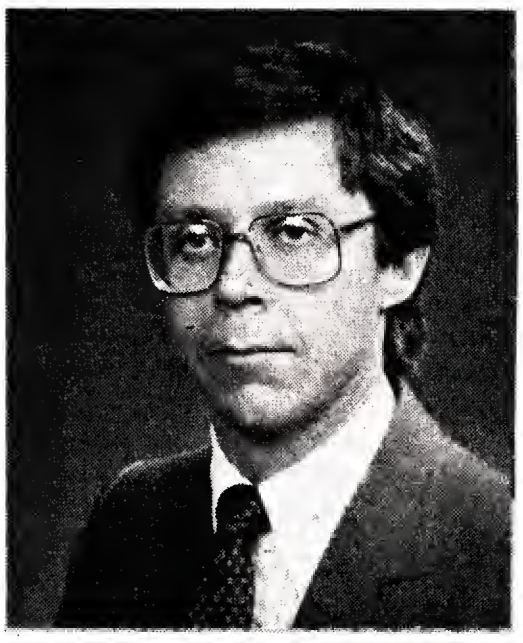
Storage tubes have low luminosity and it is difficult to see pictures in a normally lit room.

Storage tubes are not well suited to three-dimensional interactive design because of their low interactiveness. However, with all their drawbacks, they currently comprise the majority of graphics terminals in use.

Raster displays also offer an interesting set of trade-offs. The technology's main advantages are full color, medium resolution, lack of flicker regardless of picture complexity, capability to do selective erasure and video compatibility. Color capability means much more information can be displayed than is possible on a monochromatic display, thereby offsetting the main weakness of raster displays, namely low to medium resolution.

Raster displays are also used for image processing and image enhancement, printed circuit board or integrated circuit design and mechanical design (both two-dimensional and three-dimensional). But most important, they provide presentation graphics or graphics for management. It is reporting for management information systems that currently generates the most interest in computer graphics.

Today, business graphics comprises about one-tenth of the total graphics market, compared with technical and design graphics. By 1985, at least half the market will be in business graphics, according to some estimates. Clearly, there are many more uses and applications on the horizon.



Timothy K. Dudley is senior consultant at Technetronic, Inc. in Ottawa. He has worked in the computer graphics field for more than 12 years.

Dudley was responsible for the first graphics laboratory at Carleton University in Ottawa and, while with Xerox Corp. in Los Angeles, participated in the design and implementation of its graphics system and language for the Atmospheric Explorer program. He was manager of graphics systems for Bell Northern Research, Ltd. for five years.

Most recently, Dudley has worked in the areas of intelligent color graphics terminals and device-independent systems. He is also principal partner in a motor sport photography firm and a member of the American Racing Press Association.

	Raster Scan	Storage Tube	Refresh
Cost	$3,000 to $20,000	$8,000 to $15,000	$15,000 to $350,000
Resolution	low to high	high	very high
Drawing type	areas, realistic	line	line
Motion	dynamic	static	dynamic
Color	lots	green on green	mono or four-color
Interactiveness	high	low	very high
Use	intelligent terminal	dumb terminal	stand-alone systems

Figure 6

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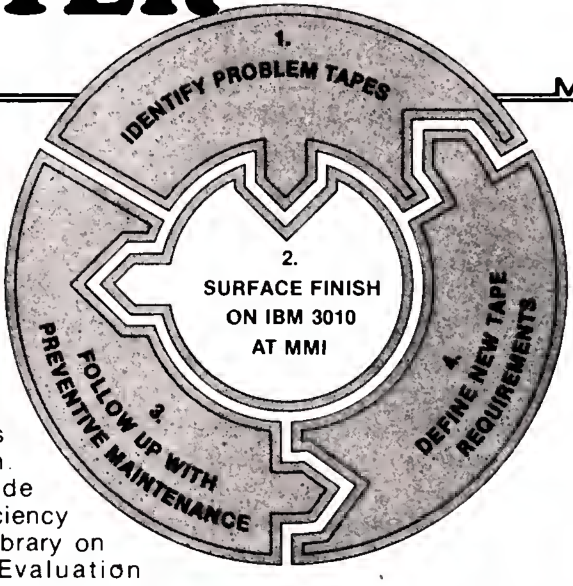

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Data Base Systems and Office Automation:

The Perfect Corporate Merger

BY EUGENE I. LOWENTHAL

Discussions about offices of the future increasingly center around information — its flow, storage and forms of human presentation. Rarely, however, do you hear about data, much less data bases in the office.

To be sure, there are important formal and even cultural differences between the concepts of information and data. Information is considered fit for immediate consumption by ordinary human beings. Data is encoded molecules of information more oriented to computers and data processing personnel. We don't often think of office personnel interacting with general-purpose data base management systems (DBMS), even when there are human interfaces such as query languages.

Yet data base systems have an important role in emerging automated office systems, not so much to provide direct services but in a vital support capacity. They will be busy backstage, where the audience can't see them. If they are not there now, it is simply because today's office is not yet ready for them.

Why should data base subsystems play a more important role in office automation? Simply put, because the office will need the added resources and capabilities in very short order, and the time to begin planning for them is now. Let's take a closer look.

Question of Tonnage

First, office systems designers need to analyze the volume of information. Companies commit to office automation because of tonnage — the need to type more letters and documents, send more messages, generate more reports and so on. Factors such as response time, worker productivity and accuracy don't become burning issues until volume exceeds some threshold.

Once a system is installed, its capacity must expand as volume grows. Eventually these systems will employ DBMS techniques to rapidly search, retrieve, modify, backup and restore large amounts of interrelated information.

Second, there is the frequently reiterated requirement to integrate DP and office functions. Today, this usually means nothing more than using the same equipment for both tasks. More advanced systems permit users to merge data from DP files into text at predesignated insertion points. For example, there might be a standard letter for customers who are late in their payments. The system that grinds out these letters automatically interrogates the customer information file to pull out name, address, amount due and other relevant data, inserting it where the original composer has left place-holders.

Data base systems have an important role in emerging automated office systems, not so much to provide direct services, but in a vital support capacity. They will be busy backstage, where the audience can't see them. The office will need added resources and capabilities soon, and the time to start planning for them is now.

If the data base facility had sufficient power, the system could periodically query the customer file and locate past-due customers who have not been sent a letter. This would automatically generate a new batch of letters.

Third, information should be centrally controlled in a shared-resource environment. Most office systems provide access to a common store of information from multiple workstations. In general, it is not efficient to have private storage attached to each workstation. Economy-of-scale considerations motivate placing bigger files on larger shared devices.

Moreover, people in different offices or areas of the office need to work with a particular type of information. Thus workstations need to be connected by some form of network.

There are many types of networks, ranging from local-area networks such as Xerox Corp.'s Ethernet to global channels that connect distant cities. All networks claim the ability to share information. This, in turn, necessitates responsibility for controlling access to shared information. Security mechanisms must ensure that only authorized individuals are permitted access to the stored data. Furthermore, the system must coordinate concurrent access to the same piece of information.

Data base systems routinely perform all these complex functions. Why reinvent the wheel?

Myriad of Relationships

Fourth, as integrated office systems become truly integrated, people will begin to appreciate just how many interconnections there are among different types of information. Workers deal with a myriad of information relationships quite naturally in the "office of the present," as is evidenced in the way they organize their filing cabinets, bookcases, stacks, in-baskets and phone messages. They will expect at least as much from future systems.

So-called electronic filing cabinets will certainly be quite sophisticated. Memos cross-referenced or following other memos, as well as supporting documentation, must be tracked.

(Continued on In Depth/38)

(Continued from In Depth/37)

Document revisions must be linked to previous versions, and sections of existing documents will frequently need to be cut and pasted into new documents.

Managing relationships is what data base technology is all about. There is no question that DBMS will become the prime resource in organizing and associating various forms of information in the office of the future.

Data base concepts are germane to solving many problems in the automated office. System developers will very likely use data base subsystems as behind-the-scene building blocks for complex office functions. This user group requires a data base capability somewhat different from today's typical DP application. It is up to these developers to find new ways to apply DBMS technology.

How will data base technology merge with office automation? The rest of this article will explore this concept, demonstrating its success with a variety of specific, localized examples. More intrepid souls may wish to present a global view of the comprehensive, integrated office.

Office Data and Nondata

There are dozens of commercial DBMS products in use today. Their data models seem to be quite different from one another, and each has its own nomenclature. With few exceptions, however, all have their evolutionary roots in that primitive creature, the Cobol record.

A record by any other name — be it group, type or data set — is still an orderly collection of fields (items, elements, domains and so on). These fields are labeled, typed and definitely limited in length. For example, a file is a collection of records, each of which is an occurrence of a declared record type. In other words, each stored record bears a similarity to a template established when the file was created (see Figure 1).

Record-oriented files are very uniform, structured vehicles for holding compartmentalized facts about classes of similar things, such as customers. They are perfectly suited to storing names, addresses and Zip Codes. They were never meant to hold such things as documents or digitized voice messages.

For brevity, the term "regular file" will be used to denote these homogeneous sets of neatly formatted records. Any file that cannot honestly be called regular is irregular. Traditionally, DBMS have been designed to operate on regular files or collections of related regular files. The great majority of DP applications require nothing more.

In the office, a significant minority of information is also plainly regular in nature. A common form corresponds wonderfully to a record template. A filing cabinet whose folders consist of nothing but filled-in forms is the paper equivalent of a regular file; it is a hierarchically organized collection of records. An interoffice telephone directory is another regular file.

Irregular Information

But most information in the office is far too amorphous or too variable in length to be regarded as regular. For example, a digitized image or voice message is most naturally stored as a relatively long, undifferentiated string of bits. Slicing up the bit string arbitrarily into short, fixed-size blocks for transmission has nothing to do with a record. The fields in a record are thought of as holding complete, discrete units of information, not meaningless chunks of a much larger unit.

Long, undifferentiated strings of text (representing digitized documents or memos, for example) are not candidates for regular files either. But structured documents, created and controlled through a word processing system, are on the borderline. In theory, each sentence could be stored in a record, provided that a very long sentence could be handled. A DBMS could thus be employed for straightforward search, retrieval, insertion, deletion and modification of individual sentences within a document represented as a regular file.

As a practical matter, however, it might be extremely costly to store a document in such a fragmented man-

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Typomatic Solid State Keyboard	STD	NO	NO	NO	STD	NO
Detached Keyboard	STD	STD	OPT	NO	STD	STD
CRT Saver	STD	NO	NO	NO	NO	NO
Block or Underline Cursor	STD	NO	STD	STD	STD	NO
80 and 132 Columns	STD	NO	NO	NO	OPT	NO
Double Size Characters	STD	NO	NO	NO	OPT	NO
Smooth Scrolling	STD	NO	NO	NO	OPT	NO
Horizontal Split Screen	STD	NO	NO	NO	STD	NO
Video Attributes Require No Display Space	STD	NO	NO	NO	STD	STD
8 Area Qualifications	STD	NO	NO	NO	NO	NO
8 Resident Nat'l Char. Sets Including Line Drawing	STD	NO	NO	NO	NO	NO
Programmable Non-volatile Function Keys	STD	OPT	STD	NO	NO	NO
Display of ALL Control Codes	STD	STD	STD	STD	NO	STD
Insert Delete Line with Push Up or Down	STD	NO	NO	NO	NO	NO
Insert Delete Character with Push Right or Left	STD	NO	NO	NO	NO	NO
Select Editing Extent to Field, Area, Line, Page	STD	NO	NO	NO	NO	NO
20 mA Current Loop	STD	STD	OPT	OPT	OPT	STD
Programmable Message Framing (non-volatile)	STD	NO	STD	NO	NO	NO
Programmable Answerback	STD	NO	STD	NO	NO	NO
Baud Rates to 19200 BPS	STD	NO	NO	NO	STD	STD
Independent Xmit/Receive Rates	STD	NO	NO	NO	NO	NO
Printer Port Independent of Communication Interface	OPT	OPT	STD	STD	OPT	STD
Paging	OPT	STD	NO	NO	STD	STD

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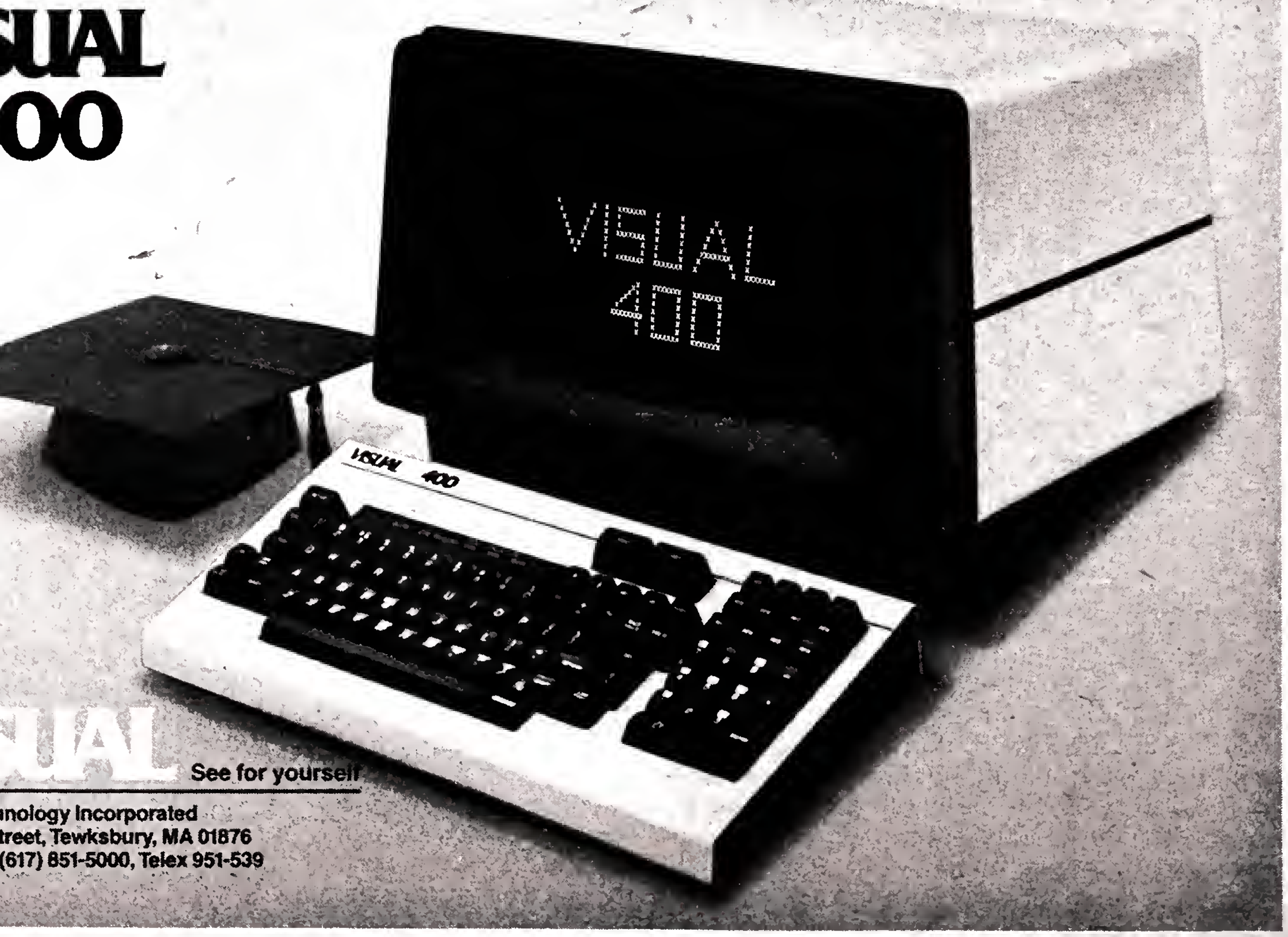

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ner, since storage overhead and the processing power needed to materialize the document quickly would be costly. In any event, if the document contained graphics, such as figures and illustrations, they could not be represented as records.

So in the office we should expect to see a preponderance of irregular files compared with regular files, while in the typical DP shop the opposite is true. After all, DP has historically focused on the computer's ability to manipulate numbers with great speed and accuracy.

Because artificial intelligence is still at the starting gate, we cannot yet program a computer to scan a digitized representation of a handwritten (or even typed) letter to figure out that Ajax Co. wants an order of 10,000 No. 5 bolts at three cents apiece. Human intervention is required.

In other words, the computer cannot distill unambiguous facts from the original text, so from a DP standpoint there is little motivation to store the text. Instead, there are armies of data entry clerks whose sole function is to extract essential data from the source input and feed it to the computer for storage in a regular file. From the DP shop's narrow perspective, data does not even exist until this distillation has occurred.

On Corporate Level

Now if we expand our vision to the corporate facilities level, we recognize that information exists from the moment it is created (or delivered), electronically or otherwise. Furthermore, whether or not a message ever gets transformed to a record in a regular file is no reflection of its importance. And, even if it is transformed, the original copy is usually retained in a correspondence file.

The automated office must deal with information in whatever raw form it arrives, long before it is digested by computers or people. The in-box is the archetypical irregular file, a hodgepodge that demands our attention. As time permits, we sort the contents of the in-box, perhaps distributing items among several stacks on the desk according to category or priority. We underline important points in memos, make copies for distribution, maybe jot some notes on an action list. Once a letter has been read and understood, it can be moved from its undistin-

(Continued on In Depth/40)

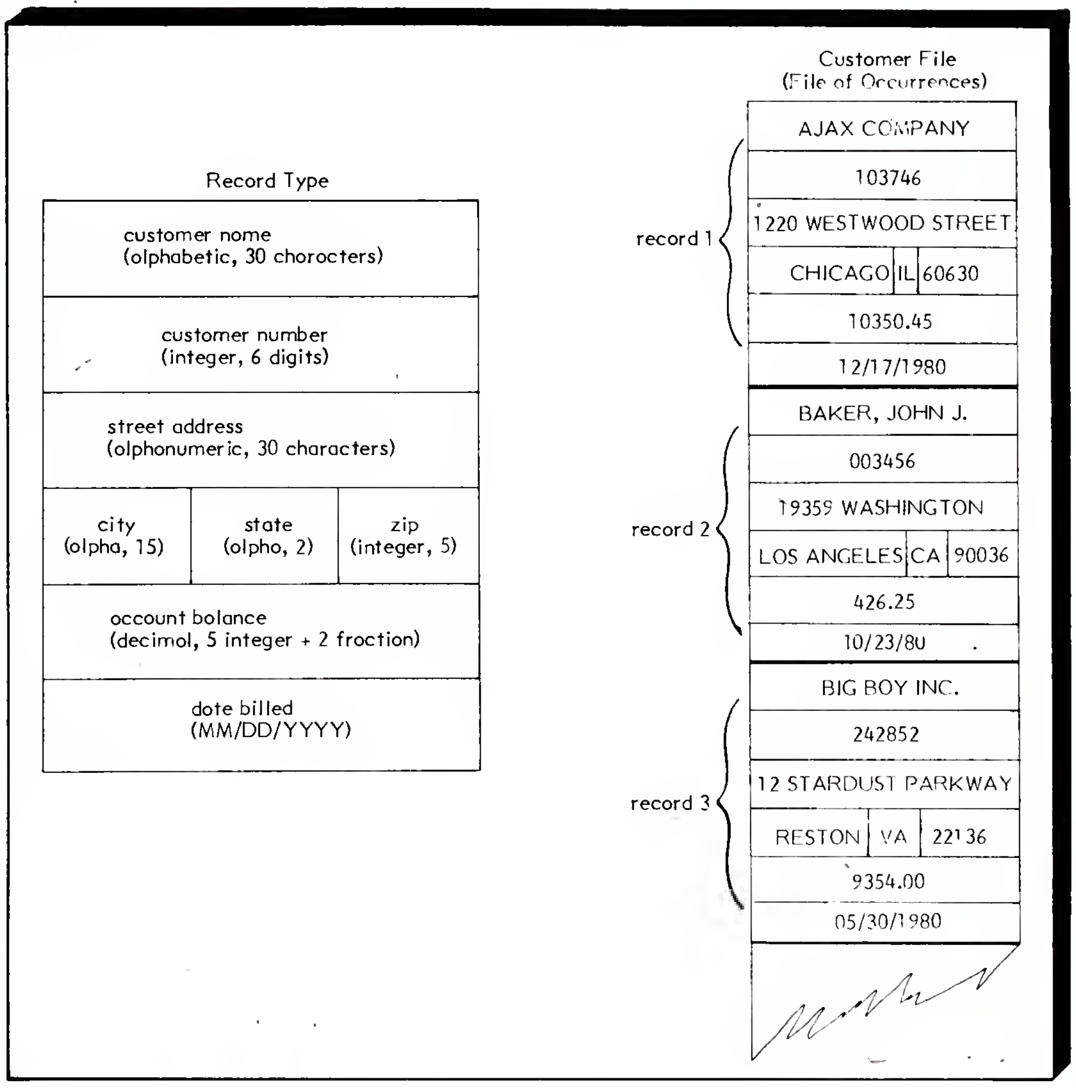

Figure 1. Regular File

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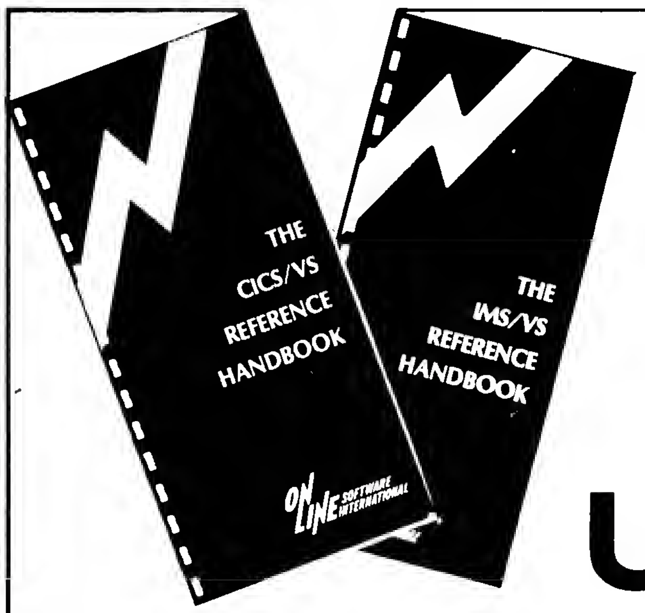
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(Continued from In Depth/39)

guished place in the in-box to a more meaningful location in an organized filing system.

New information progresses from an uninterpreted form through successions of analysis each working day in every office. Gradually each unit of information is integrated into a structure according to its meaning and relationship to other units. People, not machines, are capable of classifying information and perceiving associations. A data base management subsystem, operating beneath the surface of the automated office, facilitates this process from beginning to end.

Enlarging the Concept

Data base technology will certainly change and adapt to new office applications. Among the many changes we can look forward to are:

- Managing irregular files as well as regular ones.
- Establishing new relationships between regular and irregular files.
- Much greater emphasis on pattern (content) searching facilities.

Because irregular files predominate in the office, data base systems cannot ignore them. These files have to be controlled, particularly in situations where they are shared by many individuals.

One DBMS should be able to deal with issues of security, data integrity, concurrency, space allocation, buffer management and so on, practically independent of whether the subject files are regular or irregular. Common DBMS software and, more important, a common external interface, can be maintained. Even at the data manipulation level, where one might expect to find the greatest differences between record-oriented and recordless files, there are still some surprising opportunities for a common approach.

But the real advantage of bringing irregular files into the fold comes from allowing them to be formally related to regular fields. Figure 2 depicts how such a relationship might occur.

'Citation' Concept

A citation is a special kind of field whose permissible values are references to arbitrary segments of irregular files called excerpts. A citation simply indicates the starting and ending byte locations of some excerpt. The citation idea itself is straightforward enough, but its value derives from potential applications.

For instance, the DBMS could be asked to represent a retrieved record such that all citations are replaced by the excerpts themselves, in effect supporting fields of practically unlimited length in otherwise conventional records (Figure 3). This is somewhat analogous to the relational JOIN operator, through which records from several distinct files can be merged to create the appearance of a single large record.

In some of the examples we will consider, the citation is used to identify structures in irregular files that are not embedded in the data itself. In others, it is used to build a kind of electronic paper clip for binding several pieces of related information.

(Continued on In Depth/44)

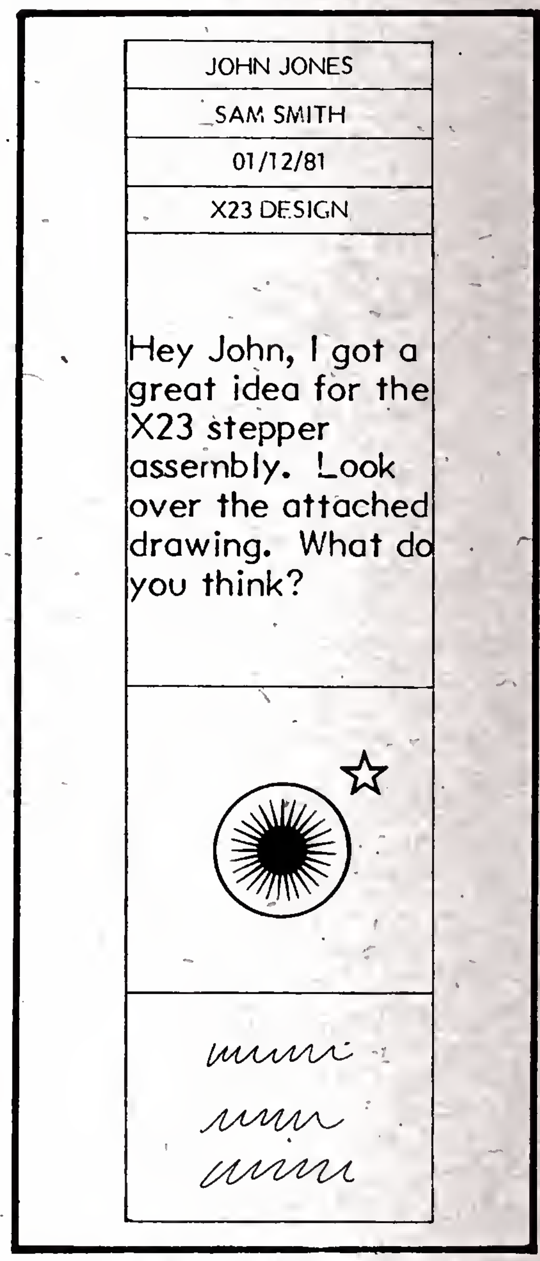
JOHN JONES
SAM SMITH
01/12/81
X23 DESIGN
Hey John, I got a great idea for the X23 stepper assembly. Look over the attached drawing. What do you think?

Figure 3. Record With Citations Replaced by Excerpts

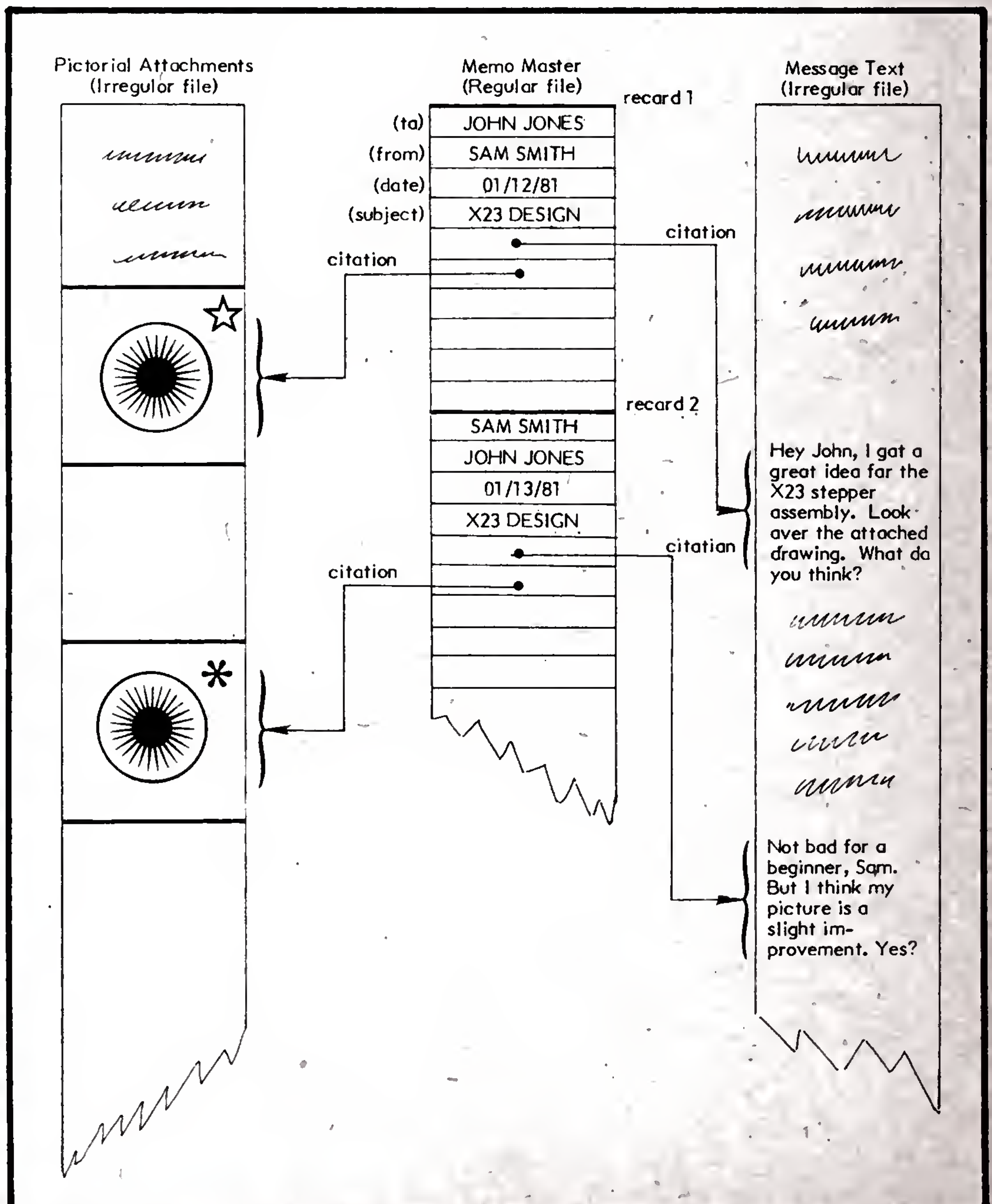
Pictorial Attachments (Irregular file)
Memo Master (Regular file)
Message Text (Irregular file)
record 1
(to) JOHN JONES
(from) SAM SMITH
(date) 01/12/81
(subject) X23 DESIGN
citation
citation
record 2
SAM SMITH
JOHN JONES
01/13/81
X23 DESIGN
citation
citation
Hey John, I got a great idea for the X23 stepper assembly. Look over the attached drawing. What do you think?
Not bad for a beginner, Sam. But I think my picture is a slight improvement. Yes?

Figure 2. Relationships Between Regular and Irregular Files

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(Continued from In Depth/40)

Pattern searching facilities go hand in glove with irregular files. Computerized document retrieval systems and text editing systems have always included text search commands that allow the user to locate documents (or sentences) containing certain words, combinations of words or sequences of symbols. In tomorrow's office there will be image data and voice data in addition to text; therefore, text searching will have to be expanded to more general pattern searching to support content-directed retrieval of such information.

The typical DBMS provides content addressing of records. For nearly all DP applications, however, it is sufficient that each candidate field be compared in its entirety to a test string (for example, CITY EQUAL CHICAGO). Substring or pattern comparisons — with "don't care" symbols and such — are not needed and are therefore rarely implemented in data base products.

Future systems will emphasize more general search capabilities. They will be used to locate desired segments of irregular files and records from regular files, including those whose fields are actually excerpts drawn from irregular files by way of citations.

A few examples will serve to demonstrate how these extensions to the data base concept might be applied in the automated office. Remember, the DBMS does not actually provide office functions such as electronic mail. Rather, it is a powerful tool which should greatly facilitate developing these functions.

The following three scenarios emphasize the use of regular files to encode structural information about related irregular files:

Electronic mail. The irregular file is a time-sequenced array of all messages that have come in since the dawn of history. Associated with this file is a parallel master file that has one record for each message or message segment. Each record in this regular file contains a citation to delineate the body of the message, and there are several descriptor fields as well (Figure 2 shows field "a" through "e"):

a. Addressee(s).
b. Sender(s).
c. Date of memo.
d. Subject — brief descriptive phrase.
e. Attachments — references to other memos or documents that are to be regarded as attachments to this memo; also, marginal notes that are added by readers.
f. Time of arrival — date and time stamp.
g. Clearance level — confidentiality.
h. Priority — for example, "read immediately."
i. Keywords — to facilitate content searches.

Each individual has an in-box and two cumulative correspondence files, all of which are regular. Each record in an in-box points to a record in the master file corresponding to an item to be read. Records in an in-box might be kept sorted by priority, and they are removed when a message has been read.

One correspondence file has a permanent list of pointers to messages the individual has authored, while the other refers to messages he has received. Through the underlying data base facility, memos in either file can be retrieved sequentially, by descriptor (key word, date, sender and so on) or by message content. Notice that in keeping with data base principles, the data (message) itself is only stored once and accessed from multiple sources through relationships.

Standard reports and form letters. We all deal with repetitive reports or letters. In some cases, production is on a regular basis, while in others, such as the dunning letter discussed earlier, production is triggered by a specific event. The basic purpose and much of the textual content remains constant, while specific data differs among instances of a given report.

Suppose that an irregular file contains the textual content of a report or letter. Allied with the report is a regular control file. The control file cites the report, indicates who owns it, when it was last invoked and so on. The control file also includes a

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series of subordinate records, each of which corresponds to a place in the report where some information is to be inserted during production. Each such record includes these fields (see Figure 4):

a. Pointer (citation) to the place in text where data is to be inserted.

b. Indicator as to whether the data is repeating, such as whether the dunning letter may include a list of overdue payments.

c. Name of the regular or irregular file where the insertion data is to be found, together with the field name if regular.

In this application, the DBMS manages all the structural information about a standard report as well as the constant and variable data from which it is composed.

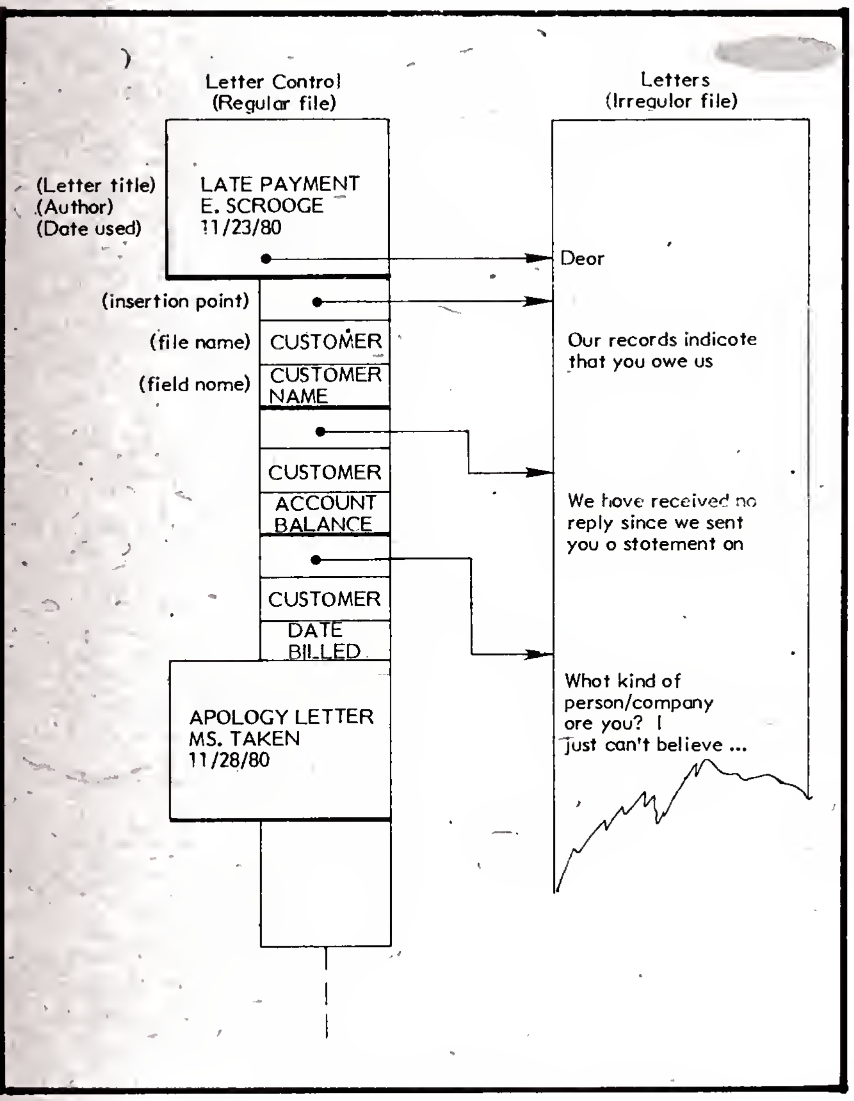

Figure 4. Form Letter Application

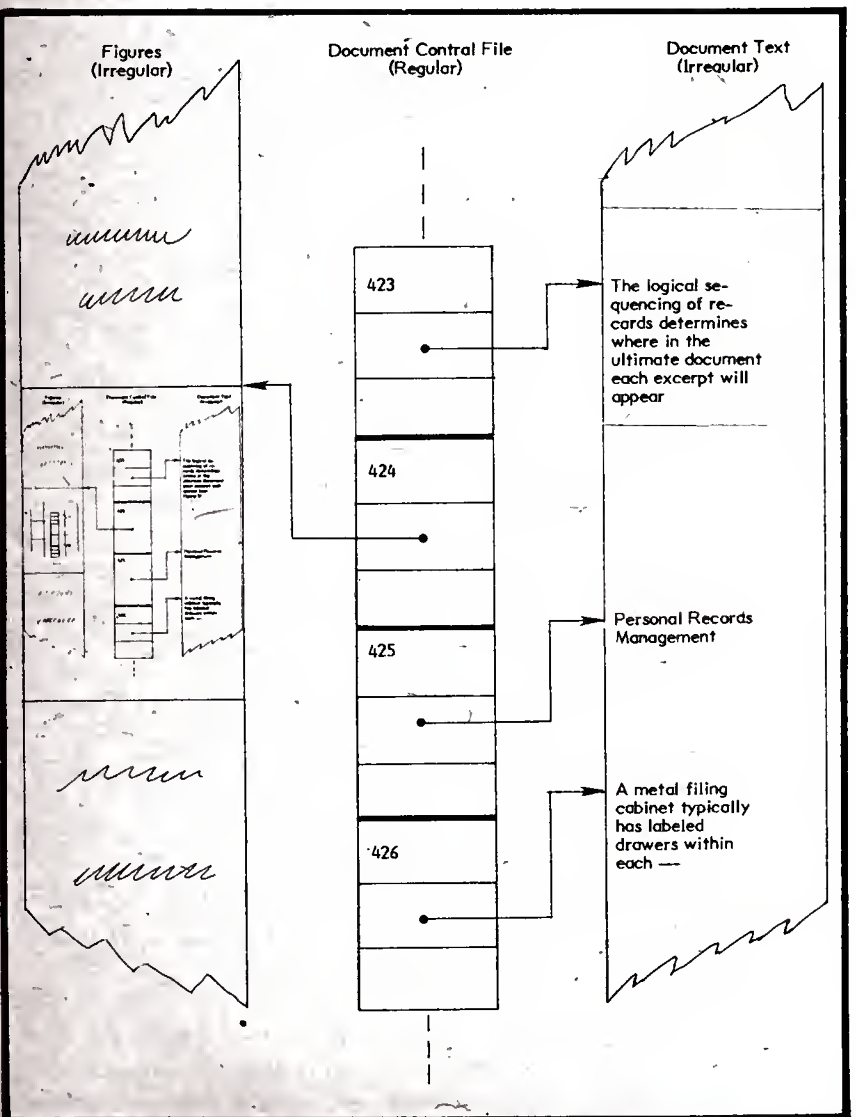
Figures
(Irregular)
Document Control File
(Regular)
Document Text
(Irregular)
423
424
425
426
The logical sequencing of records determines where in the ultimate document each excerpt will appear
Personal Records Management
A metal filing cabinet typically has labeled drawers within each —

Figure 5. Document Preparation

Word processing. The stored result of word processing is, to be sure, words. But there is also a great deal of control information pertaining to paragraph initiation, indentation, changes in typeface and so on.

The technical folks have argued inconclusively about the relative merits of separating control information from the clear text itself, in contrast to embedding it. Rather than take sides, I will simply point out that in our extended data base, an irregular file holds the clear text and a companion regular file contains the control information.

Each control file record cites an excerpt from the text file and indicates how the print module should handle it. Further, the file may be hierarchically organized, with records grouped by major section or chapter.

Within a section, records are ordered, or linked together, so that traversing the hierarchy is equivalent to reading the document from beginning to end. Entire sections can be easily moved around.

Updates are implemented by storing revised excerpts at the end of the irregular file and changing the corresponding control record's citation field to point to it. Since the original text is not overwritten, rolling back the control file — a common data base function for "undoing" updates to records — has the effect of restoring the document to an earlier version.

The following examples demonstrate the regular file's role in binding information from several sources together again through citations.

Document preparation. As used here, document preparation is a generalized form of word processing. The essential difference is that the document may contain nontextual information such as graphs, tables, figures or pictures, all of which are created and maintained separately from the text.

The publication software must splice all of these different parts together in the right way — a kind of dynamic cut-and-paste. To facilitate this process, the control file is broadened so that records can cite excerpts from more than one file. Logical record sequencing determines where each excerpt will appear in the final document (see Figure 5.)

Personal records management. A metal filing cabinet

(Continued on In Depth/46)

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(Continued from In Depth/45) typically has labeled drawers. Within each drawer is a set of labeled dividers and behind each of these may be several annotated folders.

Representing the structure of such a filing cabinet in a computer is a classic data base application. The only issue is whether a folder can have "see also" references to other folders, in which case a network data structure must be used instead of a hierarchy.

But all we have considered is the global structure, not the information itself — that is, what gets stored in the folders. If all the paperwork is forms (applications, expense reports, invoices and so on), it is possible to stay within the realm of conventional data base representations. Forms translate very nicely into records or local structures of nested records.

This is not the general case for the office, however. Folders contain a potpourri of memos, source correspondence, documents, scribbled notes, drawings, charts and perhaps even audio cassettes. Irregular data may be required even when forms are the primary media, such as when supporting receipts must accompany an expense report.

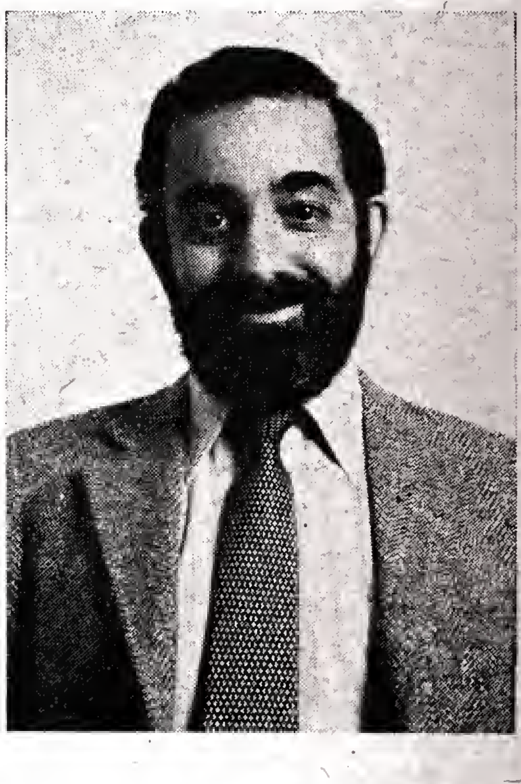
Accordingly, at the bottom of the filing hierarchy is the familiar paper clip — the regular file whose records serve to bind pieces of irregular data to individual folders or forms. The ability to retrieve folders by label or on the basis of content ("Now where did I store Joe Smith's resume?") is vital.

Around the Corner

There is certainly a place for data base management systems in the automated office. In fact, whole families of such technological adaptations are just around the corner. Old distinctions will be blurred more and more in the '80s as electronics firms expand their offerings. Manufacturers specializing in data processing, word processing and communications, for example, will increasingly overlap. Every sector is eager for a larger share of the total system.

From both business and technical perspectives, it's certainly time to broaden our horizons. Today's problems call for interdisciplinary solutions. Developing integrated office systems is an enormously complex undertaking, encompassing communications, storage, voice/image processing, graphics and, most important, human engineering.

Those who can both understand the applications and visualize the solution architecturally — who can grasp the interrelationships among the many elements of the system — will be the victors. Data base management, however hidden, will be a fundamental part of tomorrow's office automation landscape.



Eugene I. Lowenthal is manager of research and development in the area of microprocessor data base systems at Intel Corp. Before the merger of Intel and MRI Systems Corp. in February 1979, Lowenthal was vice-president of advanced development at MRI, where he was chief architect of the System 2000 DBMS.

Lowenthal received his bachelor's degree from the University of Chicago in 1966 and was awarded a doctorate in computer science from the University of Texas in 1971.

In addition to his work in industry, Lowenthal has held lectureships at the University of Texas, the University of California and several organizations in Europe.

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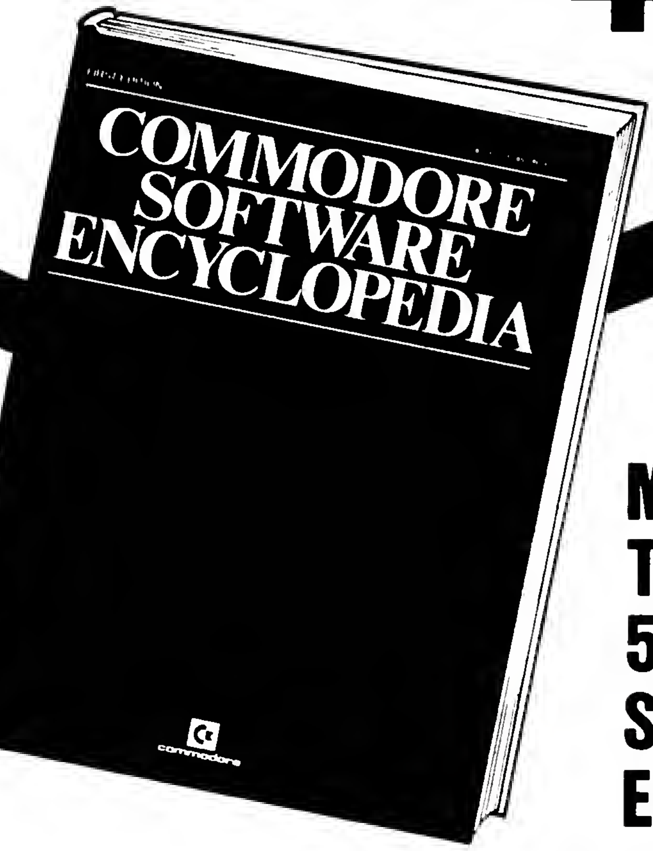

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Build Program Technique

A Practical Approach for the Development of Automatic Software Generation System

By John G. Rice

It has probably been every programmer's dream to someday walk up to a computer terminal, type a few sundry descriptions of what is required and allow the computer to automatically generate the program code. The key is to have a technique that can build a system intelligent enough to understand what you want and get the job done. More important, the technique must be able to reduce the countless hours of routine programming tasks to a matter of minutes.

The Build Program Technique (BPT) can provide the programmer and analyst with such a system. The system is called the Automatic Software Generation System (ASGS). It should not be confused with the more common type of systems such as data base management systems (DBMS), management information systems (MIS) and decision support systems (DSS). The ASGS is a tool for the programmer. BPT is the means by which the programmer can build an ASGS.

New programming techniques are not being proposed by BPT. BPT applies the concepts of the current trends of programming methodology. Furthermore, it views the program code generated by an ASGS as something much more than a set of programs or a system like DBMS or MIS. It views the resultant set of programs or systems as a product providing key information or services to people in an organization.

Because BPT views the software normally developed by programmers as a product, the program code generated by an ASGS, hereafter, is referred to as the target software product. Moreover, the target software product is generally satisfying the needs for a specific group of people such as inventory control, cost accounting, marketing and finance personnel, to name a few. Whoever the users may be, BPT requires that they be identified as a unique group to better anticipate and account for the types of requirements that must be satisfied by an ASGS in the future. Hereafter, as a matter for discourse, the target software product corresponds directly with a unique group or class of users.

The remainder of this chapter presents an overview of BPT's conceptual framework and how a typical ASGS operates. In addition, an overview of the objectives and processes of BPT is presented. Chapters 2 through 8 discuss each process of BPT that serves as a guide for the programmer and analyst in the development of an ASGS. A case study is introduced at the end of this chapter and is used throughout the chapters in this book to illustrate how each of the BPT processes is applied to the development and implementation of an ASGS.

Conceptual Framework

The BPT is a method that increases software production efficiency and reliability in an environment that dictates continuous change to existing application programs and the development of new programs. The software product is assumed to operate on a predefined data base structure.

BPT shifts the emphasis from highly specialized programming toward a more thorough analysis of information requirements. Fundamental to the BPT process and its objectives are:

1. The automatic construction of customized software modules vis-a-vis the requirements specified by a programmer or analyst.
2. The use of standardized software routines called build programs to construct the target software product.

Specifications are communicated to the build programs by a Requirements Specification Language (RSL), a key component of the technique's successful application.

BPT has proven itself to be a valuable software development aid. It has enabled programmers to increase their software production efficiency

(Continued on In Depth/48)

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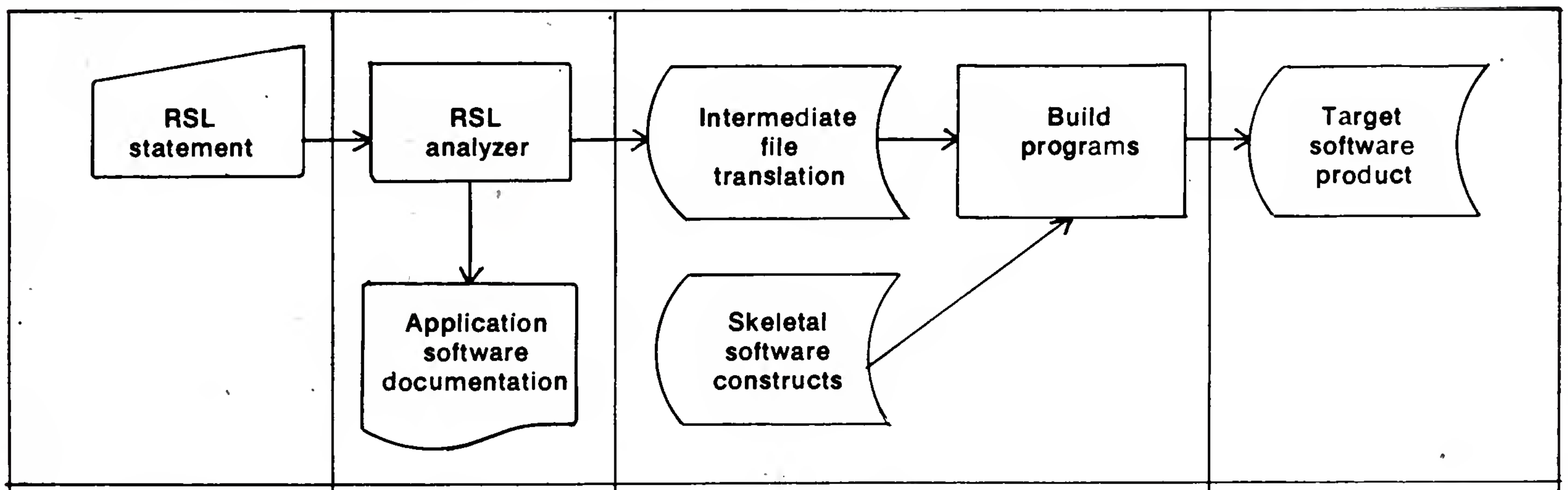
RSL statement
RSL analyzer
Application software documentation
Intermediate file translation
Skeletal software constructs
Build programs
Target software product

Phase One	Phase Two	Phase Three	Phase Four
Provide statement of requirements.	Analyze the requirements. Generate a translation. Produce application software documentation.	Interpret translation. Insert standardized programmed code. Produce customized programmed code. Assemble target software module.	Compile final software product for execution and use. Verify information generated by the new software product against requirements in phase one.

Figure 1. Four Phases of Operating an ASGS

Descriptors			Definitions
CATEGORY; NAME IS			Title of a category.
GROUP; NAME IS			Title of a group.
DETAIL FOR	REG GROUP TAX-EQ GROUP SINGLE ITEM		Detail accounting information of a regularly taxed, tax-equivalent or single account on a regularly taxed basis.
SUMMARY FOR	REG GROUP TAX-EQ GROUP	;NAME IS	Subtotals for a regularly taxed or tax-equivalent group.
GRAND TOTAL FOR	REG GROUP TAX-EQ GROUP	;NAME IS	Grand total for total earning. Assets or total cost of funds.
NET FOR	REG GROUP TAX-EQ GROUP	;NAME IS	Net interest spread for regularly taxed or tax-equivalent groups.
	Verbs		
SKIP nn LINES			Skip nn lines before printing information.
INDENT nn SPACES			Indent nn spaces to the right before printing information.
CALC YIELD CALC RATE	FOR ACCTS nn	THRU nn optional	Begin calculation of rate or yield for accounts nn THRU nn where nn corresponds to the income or expense account number.
Optional to CALC verb LESS or PLUS	nn ACCTS; (nn account numbers)		Add or subtract accounts.

Figure 2. Definition of RSL Statements

(Continued from In Depth/47)

and has provided for ease of maintenance and change to the routine programming tasks. Consequently, BPT enhances the programmer's efficiency in generating timely and accurate results demanded from an organization's information system.

BPT is a practical tool.

Operation of ASGS

There are four phases in the overall operation of an ASGS. Figure 1 illustrates the operational flow of a typical ASGS. It depicts the basic steps that occur in operating an ASGS at each phase, namely, the inputs to be processed, the operations to be performed on these inputs and the outputs to be produced.

Although an ASGS consists of four phases of its operation, the programmer or analyst is primarily concerned with the first and fourth phases. The first phase requires the programmer to provide English-like specifications of the information requirements. The fourth phase requires the programmer to compile the target software product automatically generated by the ASGS in phases two and three.

It is possible to automatically compile and execute the target software product by the ASGS. However, for the purposes of presentation, this capability is discussed in greater detail later in this book.

Phase One

The first phase in operating an ASGS requires the programmer or analyst to specify the information requirements to be generated by the target software product. The target software product is the final source code normally developed (i.e., programmed) and debugged by a programmer once the requirements are defined. Consequently, a language must be formulated to communicate the requirements to an ASGS.

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Requirements Specification Language. A key component of an ASGS is the use of an RSL to specify the information requirements to be performed by the target software product for a defined class of users.

All RSL statements can be entered into the computer through an on-line device such as a computer terminal compatible with a host time-sharing system. However, an ASGS is operationally feasible for minicomputers and large-scale hardware systems.

All RSL statements are English-like descriptions of the information requirements to be produced by a computer system. They can be entered into an on-line user-created data file by the programmer or analyst given a working knowledge of the time-sharing command language. On the other hand, each RSL statement can be keypunched on 80-column cards that are acceptable to a card reader for a batch-oriented hardware system.

Each RSL statement entered into the user-created data file is equivalent to an Ascii 80-column card image. Consequently, either method of entering the RSL statements is processed in the same manner and provides the same results.

RSL is tailored to a specific class of users. This approach provides the programmer or analyst with the flexibility to design a language that will produce rapid, reliable and accurate results as new requirements are made. Figure 2 describes the definition of each statement.

Phase Two

For any language to be understood by a computer system, there exists a modem to decode it. Such is the case with RSL. The modem for decoding RSL statements into machine-processable form, which provides a translation for the build programs, is a software module called the RSL Analyzer. The RSL Analyzer accepts the RSL statements, translates each statement and writes the translation to an Intermediate File (IMF). A basic algorithm for the RSL Analyzer and the IMF format is presented later in this book.

The RSL Analyzer is also designed to automatically provide the documentation of the resulting target software product described by the initial RSL statement. This additional feature reduces the clerical burden of traditional systems documentation of the application software product. In summary, it provides the programmer and analyst with a common and controlled approach to application software documentation.

Application Software Documentation. The application software documentation generated by the RSL Analyzer must be designed to meet the requirements established by the analyst and programmer to support the target software product. Various levels of documentation can be predetermined and built into the overall design of the RSL Analyzer.

Translation of RSL Statements. The translation of RSL statements by the RSL Analyzer can be written to an IMF in sequential binary or Ascii representation. The advantage of one over the other will depend on the type of hardware system on which the ASGS resides. For instance, if it resides on a time-sharing system, an Ascii representation is advantageous to the programmer or analyst. The system commands allow the user to list files directly for examination without the aid of a program to display the file in a formatted or unformatted fashion.

A hardware system without demand processing or on-line capabilities may not have these features. Consequently, it requires the aid of a program to display files. Furthermore, storing the translation in sequential binary is more cost-effective in terms of storage and access to the files.

The translation most often used has been to assign a number in a predefined field of each translation record on the IMF. Several fields can be defined and a coding system can be developed to represent a definitional translation of each RSL statement. The precedence order of the translation is also predetermined to provide the build programs with a structured file of information to produce the appropriate software constructs for the

(Continued on In Depth/50)

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(Continued from In Depth/49)

target software product.

Many problems can develop concerning the reliability of the target software product generated by an ASGS at this stage of its operation. For instance, ambiguities in the definition and translation of requirements can produce a software module that satisfies only 80% of the requirements specified or none at all. Furthermore, the users are not always perfect in providing their requirements.

The third phase of the ASGS is the execution of the build programs. The build programs automatically construct the target software product described by the RSL statements supplied by the programmer or analyst.

The build programs effectively simulate the programming processes of constructing a software module. Basically, they generate program code. For example, the average programmer may borrow source code from other software modules that are similar in design, remove the customized or unwanted software constructs and replace them with the correct constructs to meet new requirements.

The ASGS performs these functions automatically from the RSL statements. This book will show how to use BPT to identify the similarities, differences and limitations of an information system as an aid to the programmer or analyst toward the design and implementation of the build programs. As presented in Figure 1, there are a minimum of two input requirements for the build programs, namely, the skeletal software constructs and the translation of RSL statements that reside in an IMF.

Skeletal Software Constructs. One of the major objectives of BPT is to guide the programmer and analyst toward the standardization of all their software development. This is accomplished by automating the construction of new software. This is operationally feasible if and only if the programmable structures that must interface with a known data base structure can be identified and designed.

One of the byproducts of BPT is the identification and design of programmable structures of similar applications that never require customization or changes to the existing software constructs. The types of construct categorized in this manner are the declarative sections of the source code, subroutine names, arguments passed to subroutines and data names identified for use in a particular program, to name a few.

For the purposes of discussion, these software constructs, which never change from one application to the next, are referred to as skeletal software constructs, for an identical application in Fortran and Cobol. It is important to note that all the ASGS software constructs are designed to meet the American National Standards Institute (Ansi) standards, which are intended to ensure the portability of the target software product.

The skeletal software constructs are input to the apropriate build programs and are processed just as if they were transactions for any normal program. Each line of source code is processed in a synchronized fashion, whereby the build programs automatically insert the customized software constructs with the skeletal constructs to produce a new software module, namely, the target software product. The build programs are designed to control the timing of this insertion process.

The synchronization process of these two files is further complicated when multiple types of requirement are specified to produce several software modules at one time.

Intermediate File. Equally important to the generation of the target software product is the input provid-

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ed by the IMF, namely, the translation of RSL statements. This file determines what customized insertions of new source code statements are produced and assembled to satisfy the specified requirements.

The file can be processed in several ways depending on the complexity of the design of the language and the type of software produced by an ASGS.

Phase Four

Phases two and three are the automated components of an ASGS and can vary greatly in technical design and development. However, the overall concept and operational flow should not vary much from the illustration in Figure 1.

The fourth operational phase is the most familiar. Simply, it is the compilation and execution of the target software product automatically generated by an ASGS.

It is conceivable that this phase of the overall operation of the ASGS can be automatically performed. However, it is dependent on the capabilities of the operating system that supports an ASGS. For instance, it is possible to have the programmer or analyst enter the RSL statements in phase one and design the ASGS so that phases two, three and four are automatically executed with the aid of supervisory or executive controls of the host system. One interesting possibility is the complete elimination of source code storage and substitution of the target software product with the desired information requirement (e.g., a financial report) driven solely by RSL statements. Needless to say, there are tradeoffs that must be considered. An examination of feasible alternatives provides the programmer and analyst with various options for the design of an ASGS.

Objectives of BPT

The technique is designed to satisfy several objectives generally inherent in every organization that utilizes a computer-based information system. In addition, it addresses the managerial and technical objectives consistent with the concepts of current software development methodology.

One of the most valuable assets of an organization is information. The availability and accuracy of information is critical. The programmer and analyst must be responsive to organizational needs by developing or changing a software product that provides the esential information.

Timeliness and Accuracy. The soft-

(Continued on In Depth/54)

The Seven BPT Processes

Each of the seven processes of BPT has been inferred or illustrated thus far. Each process of BPT is a component of the formula for the design, development and implementation of an ASGS. In addition, these processes represent the strategy that achieves and maintains the organizational, managerial and technical objectives of BPT just described.

The implementation of BPT requires the completion of a series of tasks. These tasks can be scheduled and progress can be measured. The seven processes of BPT are the following:

1. Identify, define and analyze the requirements of all users and classify each one.
2. Determine the existing data base elements, those currently missing and their relationships to the defined and anticipated user requirements.
3. Identify the similarities of requirements for each class of user and design programmable structures that satisfy user requirements.
4. Formulate an RSL tailored to the class of users.
5. Develop an RSL Analyzer that translates the requirements for the system software generators or build programs.
6. Design and program the build programs that automatically construct the necessary software to satisfy requirements specified in RSL.
7. Verify that the results of the RSL statements and build programs map directly back to the first three tasks.

Each process is discussed in greater detail in this book, explaining how each is carried out, pitfalls to avoid and interrelationships between tasks. Alternate approaches are also discussed. The table below summarizes the operational components of an ASGS and the required BPT processes to complete. These processes correspond directly to each phase of operating an ASGS.

ASGS Component	Corresponding BPT Process
1. Requirements Specification Language	Collection, analysis and definition of requirements Data base requirements Design of the customized code of the target software product Formulation of the RSL
2. RSL Analyzer	Formulation of the RSL Designing the RSL Analyzer
3. Intermediate File	Designing the RSL Analyzer
4. Skeletal Software Constructs	Design of the customized code of the target software product Designing the build programs
5. Build Programs	Design of the customized code of the target software product Designing the build programs

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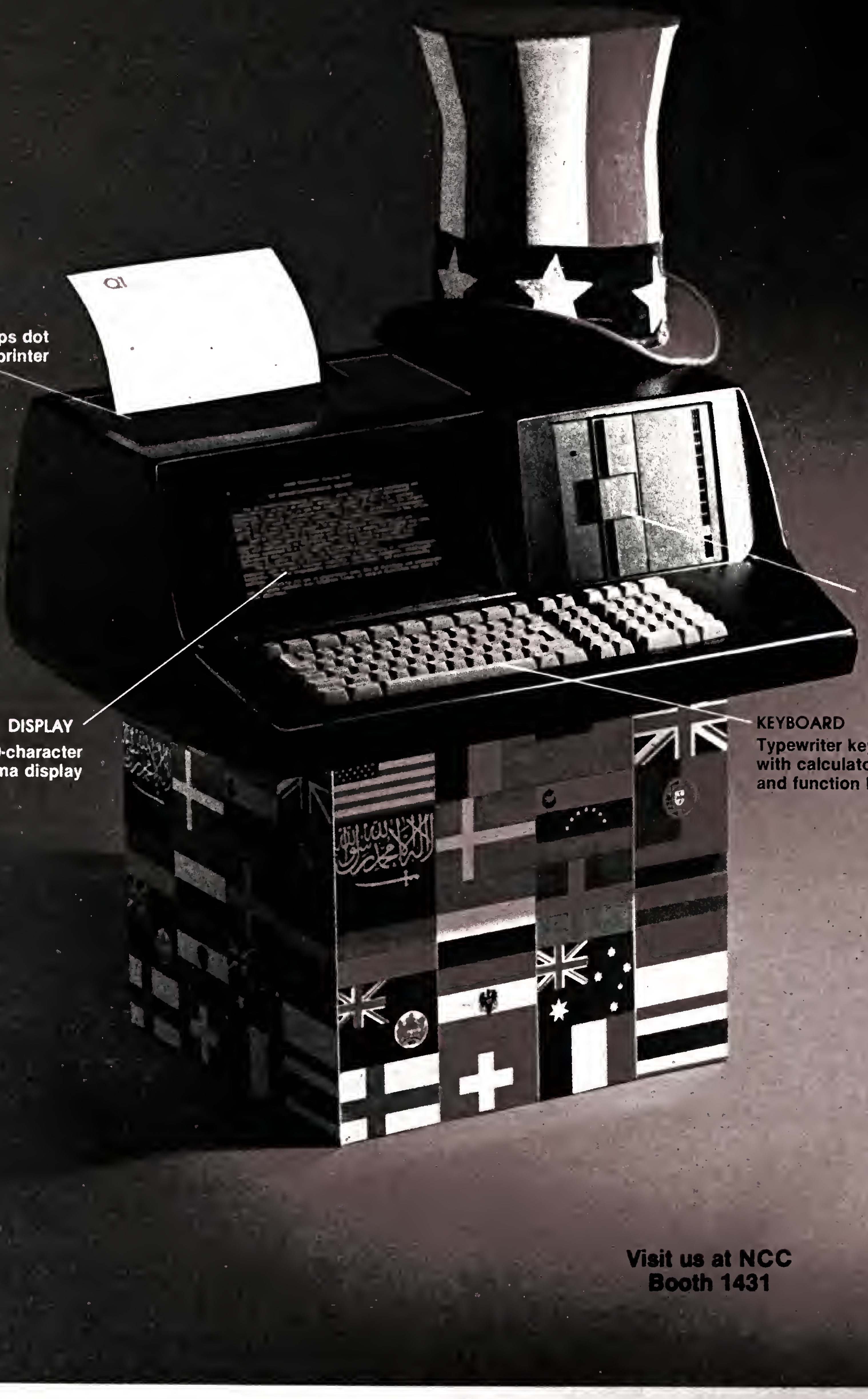

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(Continued from In Depth/51)

ware product must provide timely and accurate information to be responsive to organizational needs. BPT is an approach that provides the programmer and analyst with the necessary tool that is responsive to organizational needs.

BPT is a method that ultimately results in the design, development and implementation of an ASGS. An ASGS, by its design, automatically generates a software product meeting organizational protocols, providing an organization with timely and accurate information without using unnecessary human resources.

Minimize Overhead Costs. While an organization may place a high value on timely and accurate information, it also wants to obtain this valuable asset in the most cost-efficient manner. Generally, an organization wants to minimize overhead costs in all areas of the business, especially in data processing. One way to reduce overhead costs is by staffing a few high-quality programmers and analysts to support a computer-based information system rather than maintaining a larger number of data processing personnel.

BPT permits this type of cost savings to the organization without burdening the data processing personnel who support the computer-based information system. The ASGS replaces many of the clerical programming and support tasks that require the employment of a large programming staff. The replacement costs of an ASGS are less than a large programming staff in many ways.

Minimize Organizational Vulnerability. Finally, the organization needs to minimize its vulnerability to potential turnover of data processing personnel. BPT addresses this issue in much the same way as it reduces the overhead costs of data processing personnel. An ASGS that produces and maintains the software development of the organization's information system always remains with the organization. Proper documentation and training procedures for the use of the ASGS is one of the processes of BPT that minimizes organizational vulnerability to potential turnover.

Managerial, Technical Objectives

The programmer and analyst must develop and implement managerial strategies that cope with the demand for information and address organizational objectives for both the short and long range. In addition, they need to employ technical methods that support the software product while technological changes to the information system occur.

Increase Programmer Productivity. The most obvious managerial strategy addressed by BPT is to increase programmer productivity. Essentially, BPT first looks at the programming tasks and identifies those that are similar in terms of the program's input, the operations to process the input and the output.

In many instances, similar programming tasks result in a software product that varies greatly in its design, structure and technical clarity when performed by different programmers. As a result, when changes are required the productivity of other programmers forced to cope with the different styles and approaches is impeded. By examining the similarities of programming tasks for a specific class of users, BPT standardizes software development and provides a timely and structured approach to the maintenance and change of similar programming tasks. For instance, if each program is identical in its design and structure and is technically understandable to each programmer who is knowledgeable of the particu-

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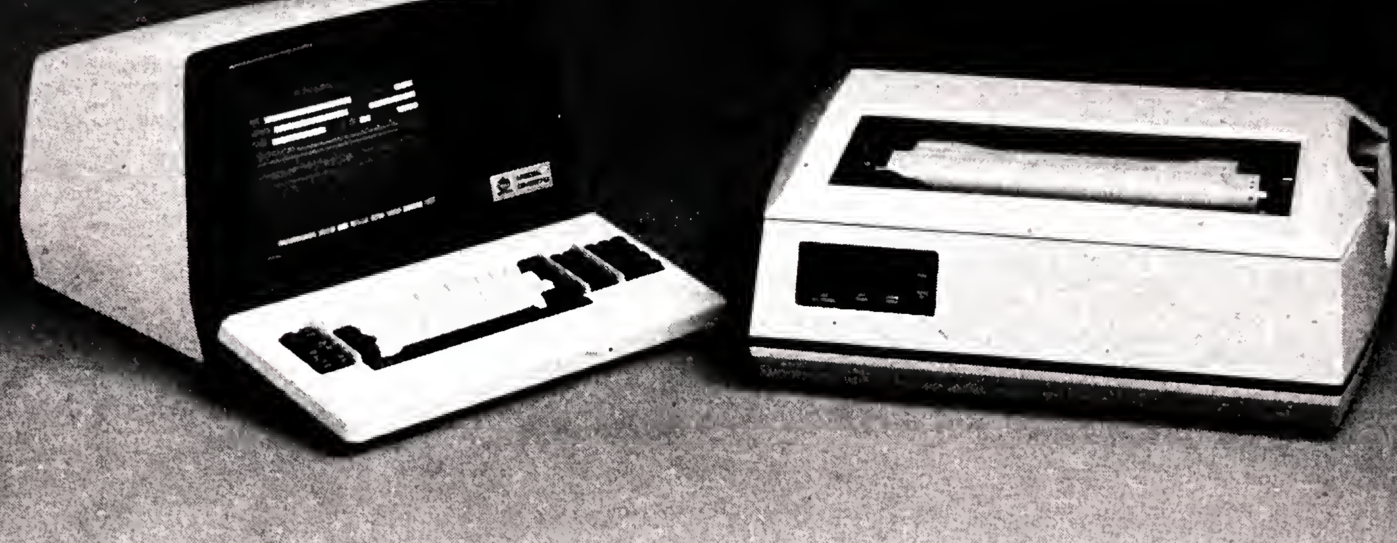

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lar application, it follows that it is easier to support.

In addition, BPT examines the programming tasks that are dissimilar in terms of the operations required to process the input and the various types of output that are requested. Once these dissimilarities are identified, it can be determined how to automate each programming task and subsequently increase programmer productivity with the prescribed approach presented in this book.

The greatest benefit to the programmer is that the clerical burden of routine programming tasks is reduced dramatically. Consequently, the programmer enjoys the job and can be involved in the more challenging tasks at hand. The benefits to the organization are a better utilization of its resources and the assurance that timely and accurate information can be provided.

Improve Software Reliability. BPT improves software reliability through its methodology for designing, developing and implementing an ASGS to automatically produce software from user specifications provided to it. For example, if two or more programmers are provided with an identical set of information requirements, an ASGS automatically generates the identical target software product. Every line of program code is identical as well as the logical construction of the target software product.

Normally, if a set of identical requirements were provided to several programmers, the end result would be several different versions of the target software product. Consequently, costs to maintain and support the product increase as changes are made to it. The fact that any number of programmers are making changes to a software product can reduce the reliability of the information it is providing to an organization.

Software Portability. The best-designed system may not be portable to another hardware environment if standards are not employed in its design. BPT assures that Ansi standards of programmed code are adhered to in the design of an ASGS. To date, Fortran and Cobol programming languages are the most portable languages. Examples using these languages are presented in this book.

Efficient Maintenance of the Product. The support of a software product is an inevitable and continuous activity that occurs once the product is operational. Many authors contend that the maintenance activity is simply another way of describing a testing activity. In many situations this is the case.

BPT produces a software product that is reliable and tested. Consequently, the ongoing activity following the product's use is truly a maintenance activity. It is not an activity that includes changing the software product because it does not work properly. It is an activity that requires changing the software product to satisfy new requirements not identified or needed when the product requirements were first described.

Generally, an ASGS produces a software module that works immediately and satisfies all specified requirements. The seven processes of BPT (see box on In Depth/51) ensure that this is the case.

An ASGS, by its design and use of RSL statements to define user requirements, provides for the efficient maintenance of the software product. The similarity of program code produced by an ASGS allows the programmer and analyst to quickly identify the area of the program to be changed and how to do it in a reasonable time period. In addition, a change to the program is made with a great degree of confidence that it will work properly.

The programmer and analyst also have the option of saving the original RSL statements and modifying them to produce a new target software product with an ASGS that includes the change that replaces the obsolete software product. Consequently, the programmer and analyst are truly maintaining the product and are not directly involved in a change to the current software product.

The ASGS has been used to automatically produce financial application programs for Decision Support

(Continued on In Depth/56)

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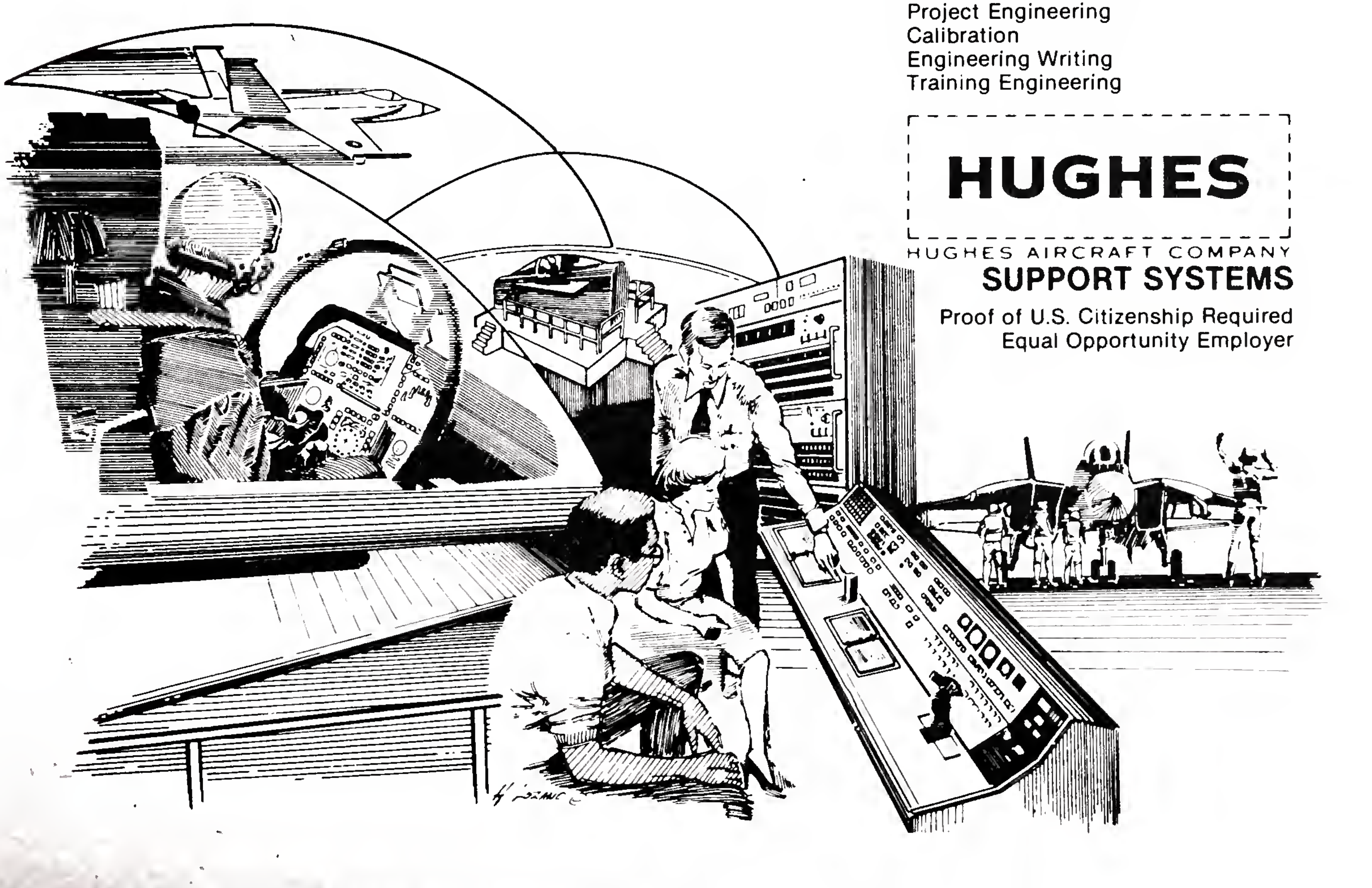


(Continued from In Depth/55)

Systems (DSS) implemented in commercial banks and other financial intermediaries.

Basically, the ASGS generates a target software product designed to provide the corporate management of these financial institutions with several types of analytical report. They include:

1. Periodic and Comparative Financial Statement of Condition and Statement of Earnings Reports.
2. Periodic and Comparative Interest Reports.
3. Interest Variance Analysis, Rate and Mix-Volume Reports.
4. Periodic and Comparative Key Financial Ratios Reports.

Software Product Recovery. Most systems provide a recovery mechanism in the event that software is destroyed. One constraint associated with recovery techniques is the time required to recover the software. In many instances it is possible to recover software in a day using an ASGS.

Many factors affect the ability of a system to quickly recover software. One benefit that is a byproduct of an ASGS is its ability to recover lost software quickly and efficiently without sacrificing any of the aforementioned objectives of BPT. This is accomplished by saving the RSL statements that describe the lost product and resubmitting them to an ASGS. An ASGS automatically reproduces or recovers the lost software product and it is ready for immediate use.

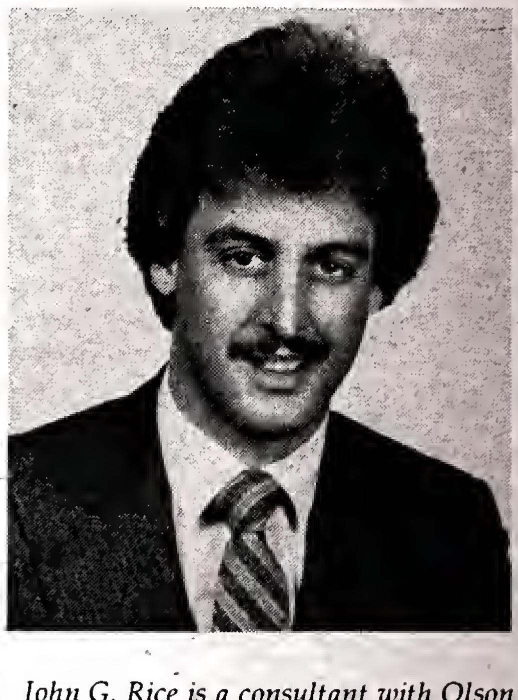
Depending on the size of an ASGS and the complexity of the software product, the lost software can be recovered in less than one hour.

Minimize Effects of Data Base Changes. Data base changes are inevitable. As an organization grows so does its requirement for more information. Consequently, changes to the physical structure of a data base occur. BPT can be used in restructuring, designing and implementing a data base and simultaneously changing the target software product.

An ASGS can reproduce new software to reflect data base changes. For example, suppose certain records are redefined and physically restructured without changing the logical structure of the data base. The programmer or analyst can simply change the RSL statements that describe the data to be accessed and operated on to produce the necessary information. The obsolete software can then be purged and replaced by the new target software product.

If the logical structure is changed dramatically, then a reexamination of the build programs is required and changes are probably in order. Once these changes are implemented, the entire information system can be regenerated automatically to reflect the data base changes. This approach is cost-efficient and assures a high level of integrity for the total information system.

In summary, BPT is a better approach in managing the support activities of software. Providing the programmer and analyst with an automated approach to software maintenance improves their productivity and attitude while they resolve the challenging issues that occur during the support of a computer-based information system. In addition, each of these maintenance activities can be completed in a reasonable time.



John G. Rice is a consultant with Olson Research Associates, Inc. of Silver Spring, Md. The firm specializes in developing financial planning models for reporting, analysis and forecasting.

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- **CompEd Technical Education**—*providing live, hands-on DP technical education courses.*
- **Data Center**—*furnishing systems development and maintenance capability, disaster/backup recovery planning, and data center consulting services.*

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In 'New West'

Computer Corrals Data, Cattle Rustlers

Special to CW

FORT WORTH, Texas — In the early days of the West, a cowboy's only defenses against cattle rustlers were a fast horse, a quick gun and a hot branding iron. These days, however, the good guys' defense against the bad guys includes Colt automatics — the state-of-the-art computers.

Computers are part of the arsenal at the nation's largest private antirustling organization, the Texas and Southwestern Cattle Raisers Association (TSCRA). The nonprofit, 104-year-old group employs 32 Special Texas Rangers as field investigators, as well as 90 brand inspectors who keep track of the six- to eight-million head of cattle sold annually throughout Texas.

To corral this constantly changing data, record the names of buyers and sellers and hopefully pinpoint any instance of stolen cattle, the TSCRA uses a Sperry Univac 90/30 computer system. The computer — deputized in 1977 — contains summary data as part of an electronic microfilm index. Records have been microfilmed by the organization since 1967.

When an officer wants to check out a rustling lead or locate an alleged criminal, the computer zeros in on the exact microfilm file. Since its introduction, the TSCRA's electronic marshall has cut the records search time from hours to a matter of minutes.

"Texas has about 14 million cattle — more than 10% of the cattle in the nation — and certainly more than that percentage of the rustlers," Don C. King, secretary-general manager of TSCRA, explained. And today, "everything is geared to the computer."

Since its debut, the computer system has been doing double-time for the Rangers because, as expected, rustlers have also kept up with the technological Joneses.

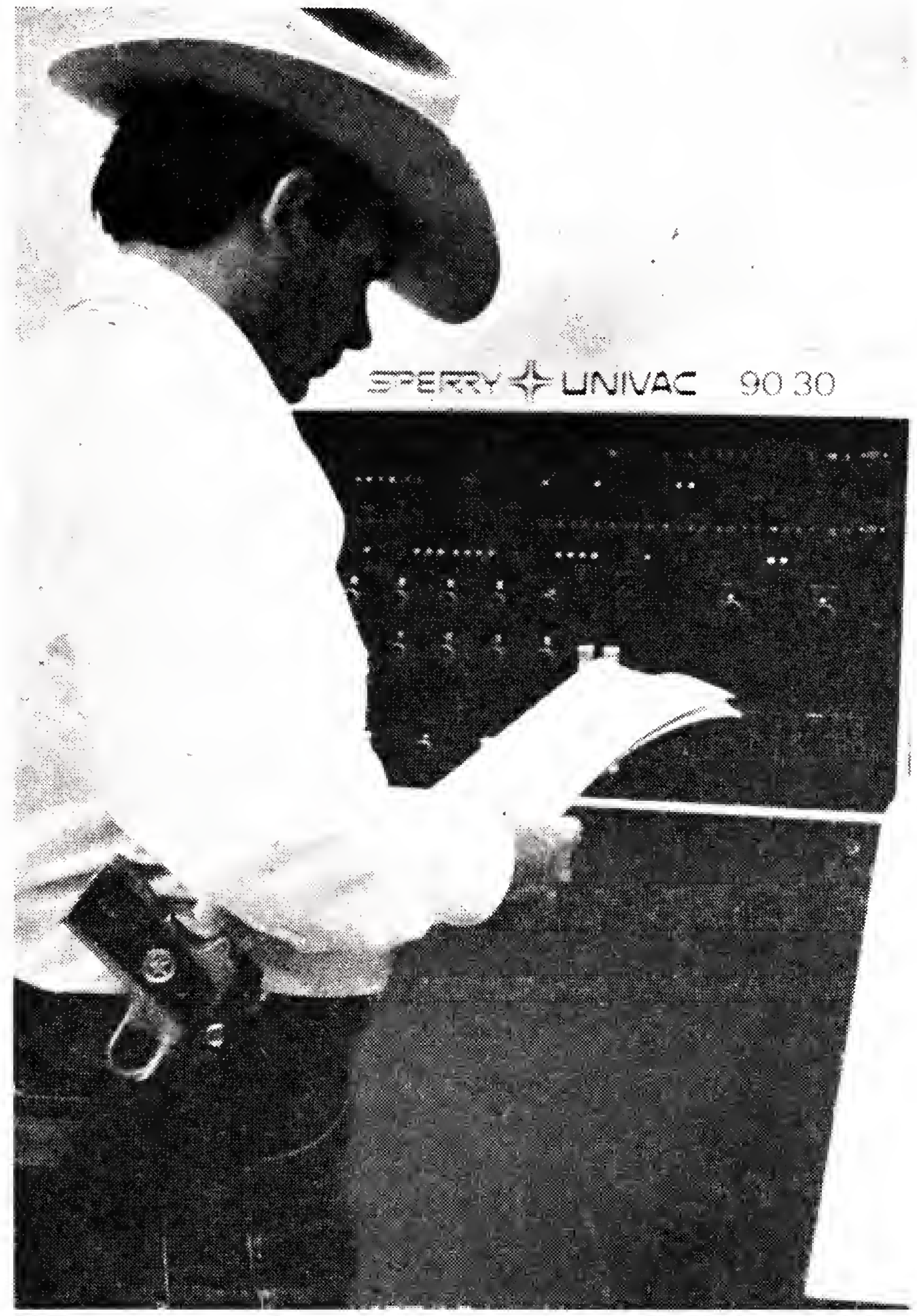
While black hats and mean-looking horses are fine for the Hollywood version of your typical rustler, today's cattle thief relies on trailor trucks and portable communications equipment. However, like in the "old days," the basic incentive — money — is still there. On the black market, a cow can be worth $500, and a truckload of cattle can bring around $10,000.

When a field inspector gets a report of cattle with a particular brand being stolen, a computer check is run of all the cattle with that brand sold during the relevant time period. The computer produces a summary list of appropriate microfilm cartridge numbers and document numbers.

Using this list, a microfilm operator makes copies of the acetate forms. The investigator then uses these records to track down the person on the selling end of the cattle, determine if the cattle were stolen and rustle up any intermediaries who took part in the alleged crime.

Sometimes, Rangers interview four or five "decent folk" before coming to the ornery cow dealers. This legwork can involve weeks and sometimes years of tracking, and on occassion has resulted in a modicum of fast-draw gunslinging.

"If we get a hot one, we can rerun the search for the man's name, for say, the six months before the suspect transaction and shake out his other sales of cattle," DP manager James A. Grady pointed out. "Thus, the system is a tremendous help in detecting multiple crimes by the same individual."

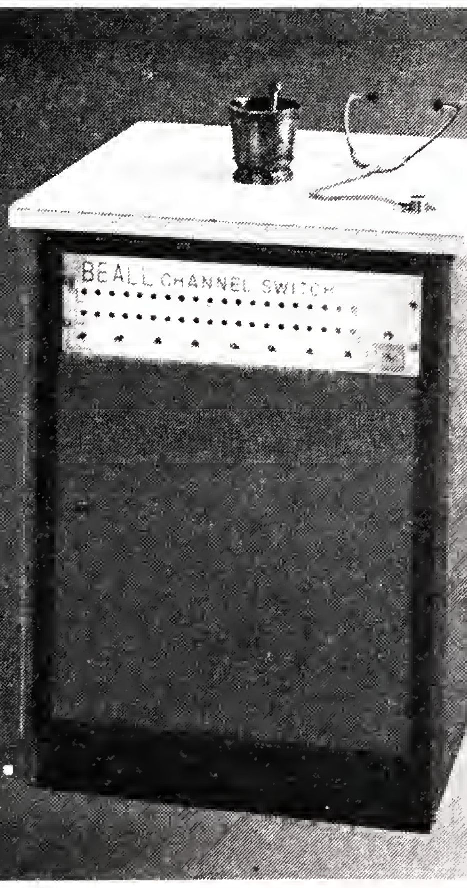


A.L. ("Butch") Davis Jr., one of 32 Special Texas Rangers employed as rustler chasers by the Texas and Southwestern Cattle Raisers Association, checks copies of microfilmed sale records.

Has the system helped law enforcement officials here cut down on the number of rustlers? Well, working with the computer and state and local officials, 321 cases of cattle theft have been uncovered, with 103 of these being brought to trial.

Field inspectors have recovered or accounted for 449 stray or stolen bulls and steers, 859 stolen cows and heifers and an assorted number of calves, horses, goats, saddles, trailors and miscellaneous ranch property. The total cost of all this stolen merchandise is about $1,131,884.

The TSCRA purchased the 90/30 because — like a good ranch hand — it provides the most power for the fewest dollars. Since only about 50% to 60% of the machine's time is spent rounding up rustlers, it is used the rest of the time for the organization's accounting, billing and mailing lists, Gardy said.



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Multiapplication Systems

CAD/CAM Turnkeys Debut

BEDFORD, Mass. — Computervision Corp. has announced the Designer M family of computer-aided design/manufacturing (CAD/CAM) systems.

The family of turnkey systems features mechanical design and drafting, manufacturing engineering/numerical control, printed circuit design, plant and piping design, cartography and integrated circuit design functions, the vendor said.

The system can support a maximum of three tasks — two interactive and one batch.

The Designer M system offers the same level of multiapplication graphics performance as Computervision's Designer IV CAD/CAM system. This means a broader range of beginners and engineers can now use the system, the vendor claimed.

Users may add an optional pen plotter, photoplotter or paper tape punch/reader. Communication links are also available to expand system capabilities. Available links include CVNet and Graphics Network Architecture, the vendor said.

Software for the systems is a subset of Computervision's Cadds3 software and is supported by one common data base.

The Designer M family comes with the firm's CGP-80 graphics processor, a fixed-media disk drive and a magnetic tape drive for $180,000, the vendor said from 201 Burlington Road, Bedford, Mass. 01730.

Kern Unveils Plotter

BREWSTER, N.Y. — Kern Systems, Inc. has announced the GP-1 master X Y plotter.

Designed to meet the needs of computer-aided drafting applications, the plotter features a .04mm accuracy and a .6g acceleration curve that reportedly gives the plotter a throughput of up to six times that of other plotters with the same drawing speed.

The unit offers a four-position drawing head that accommodates ballpen, technical pen or scribing tools. It can plot on paper, mylar and scribing film, the vendor said.

The unit costs $62,900 and delivery is in 75 days, the vendor said from Department 14, Geneva Road, Brewster, N.Y. 10509.

Bank System Offers Proof, Posting Tasks

TORRANCE, Calif. — A bank information system designed for community banks and said to perform the functions of both a proof machine and a posting system has been announced by Cado Systems Corp.

Bancado handles NOW accounts, demand deposit and savings accounts, installment and commercial loans and automated clearinghouse processing.

The system consists of Cado's 20/20 computer with video screen and keyboard terminals, floppy or Winchester disk storage, printers and Bancado software.

Available immediately, the Bancado system is priced between $30,000 and $50,000 from Cado Systems Corp., 2771 Toledo St., Torrance, Calif. 90503.

Genisco Offers Overlay Option

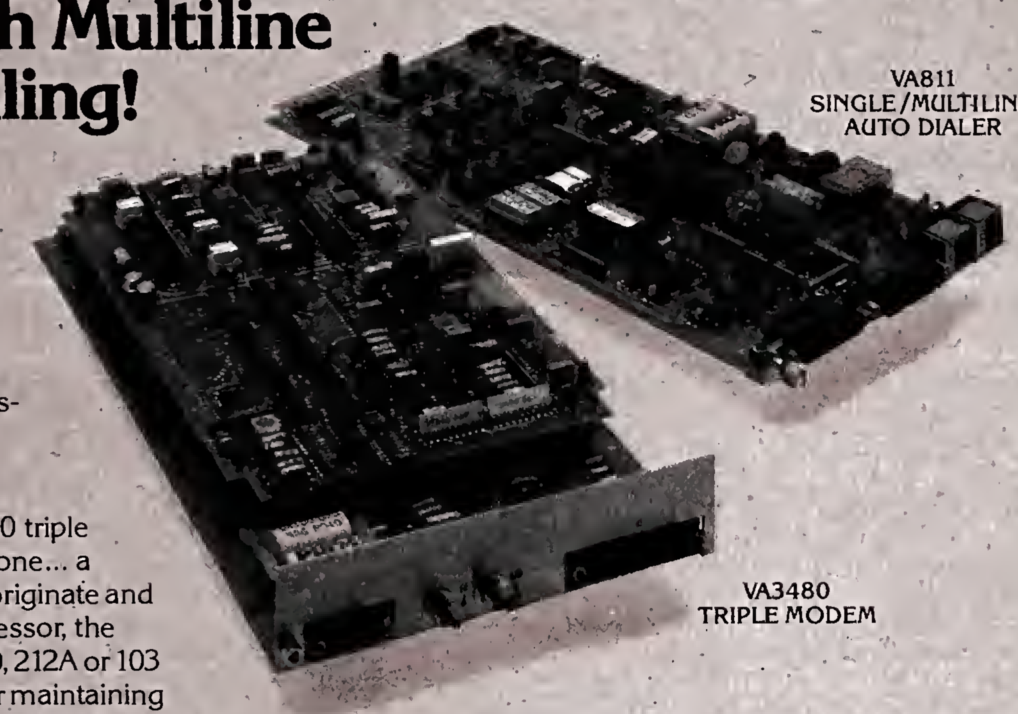
COSTA MESA, Calif. — Genisco Computers Corp. has announced an alphanumeric overlay option that reportedly allows users of its G-1000 high-resolution graphics terminal to insert alphanumeric data in the graphics image or switch between full screens of alphanumerics without destroying the data.

The text windows are generated by suppressing the graphics in any position where the alphanumerics appear, the vendor said.

With a delivery time of 60 days, the Alphanumeric Overlay Card is priced at $925 from Genisco Computers Corp., 3545 Cadillac Ave., Costa Mesa, Calif. 92626.

Dear Ma:

Now Racal-Vadic has an Originate/Answer Triple Modem with Multiline Dialing!



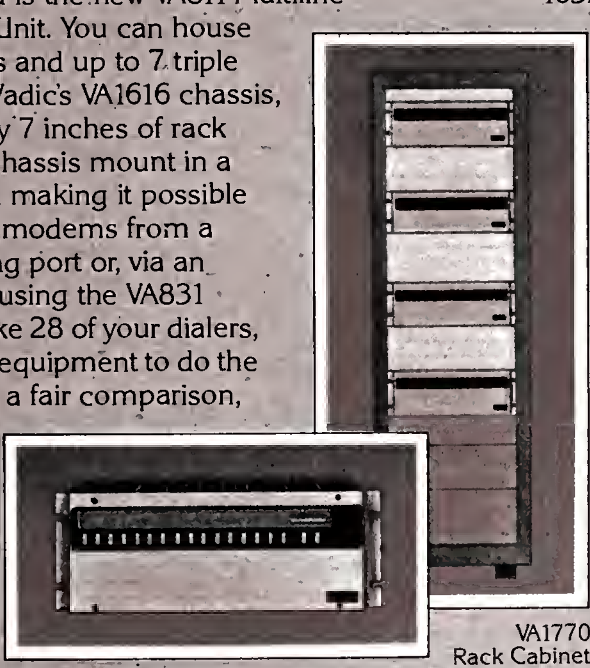
The two PC boards at the right are making it easy for computer sites to standardize on a single modem for all full duplex 1200 and 0-300 bps data transmission over your dial-up network.

Originate/Answer Triple Modem

First there's Racal-Vadic's new VA3480 triple modem. Actually, Ma, it's six modems in one... a VA3400, a 212A and a 103 with automatic originate and answer. Thanks to the built-in microprocessor, the VA3480 can automatically call any VA3400, 212A or 103 remote modem, with the central computer maintaining complete control, including selection of high or low speed modes, and modem ID. In the auto answer mode, the VA3480 changes into a VA3400, 212A or 103, depending on which type modem is calling. It's really a "do everything" modem, Ma.

Single/Multiline Automatic Dialer

The other card is the new VA811 Multiline Automatic Calling Unit. You can house one of these dialers and up to 7 triple modems in Racal-Vadic's VA1616 chassis, which takes up only 7 inches of rack height. 4 of these chassis mount in a 7-foot rack cabinet, making it possible to control 28 triple modems from a single RS366 dialing port or, via an RS232C interface, using the VA831 adapter. It would take 28 of your dialers, and many racks of equipment to do the same thing. Hardly a fair comparison, is it, Ma.



VA1616 Chassis

VA1770
Rack Cabinet

VA3480 Replaces 8 of Your Modems

The VA3480 replaces 8 of your modems — the 103A/E/J, the 113A/B/C/D, and the 212A without altering hardware, software, or changing dial-up disciplines, and it can communicate with all versions of Racal-Vadic's VA3400 as well.

The VA3480 is truly a modem for all reasons, Ma. Better phone or write for full details today. Dial **(800) 543-3000, OPERATOR 510.**

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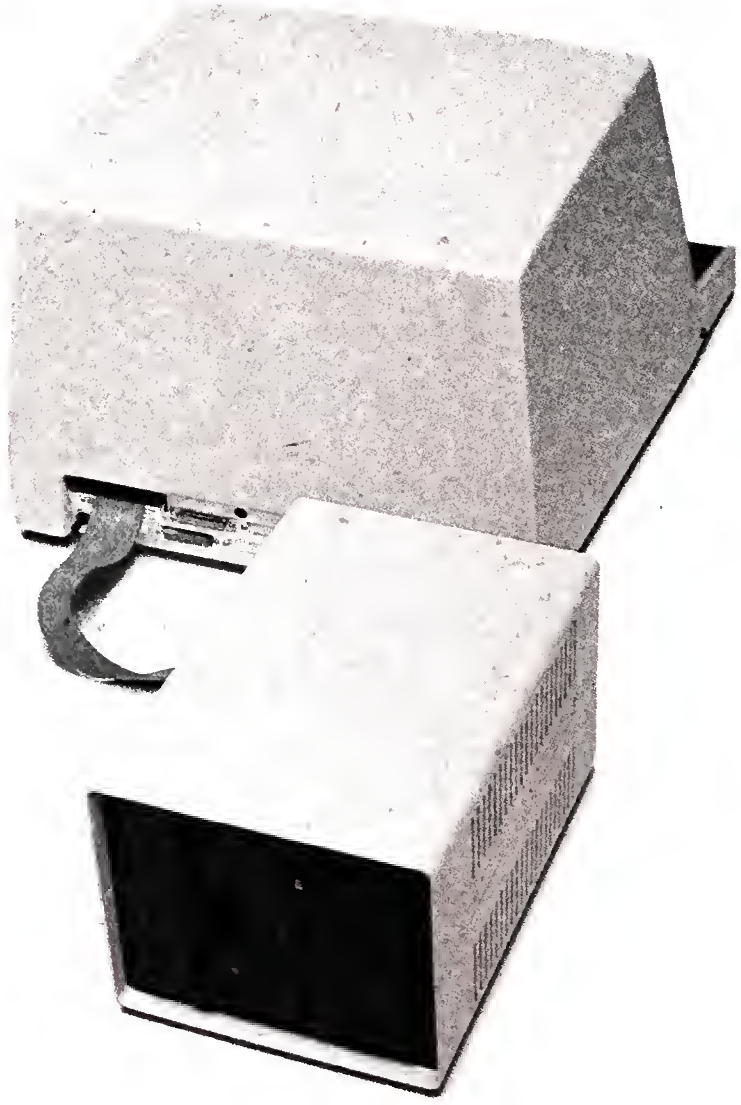

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"And we're reliable. Our powers won't diminish, our abilities won't fade, and dedication to mankind won't weaken.

"For more information and your nearest dealer, call Vector at 800-423-5857. In California, call 800-382-3367. Or write to them at 31364 Via Colinas, Westlake Village, CA 91362.

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Quadruples Communications Speed

Latest B90 Combines WP, DP Functions

DETROIT — Burroughs Corp. has expanded its B90 computer series by introducing a minicomputer-based word and data processing system said to offer four times the data communications speed and twice the disk capacity as other systems in that line.

Aimed at small to medium-sized users, the B93 can be used as a stand-alone station or as part of a widely scattered distributed data processing network. The system uses the firm's recently unveiled English language Word Management System software that allows a user to run both word processing and computer application programs at the same time, a spokesman said.

In addition, system terminals in the user's local network can be designated as both a data entry/inquiry station and as an operator control display. This reportedly lets the user place control of the computer where it is most effective and locate the processor where most convenient.

The B93's CPU takes up less than 5 sq ft of floor space and has a basic memory of 256K bytes. The memory can, however, be expanded to a maximum of 512K bytes, the spokesman noted.

The CPU also contains eight I/O channels, up to three disk controllers, on-board diagnostics and up to four data communications channels to handle user traffic. In addition to its standard memory, the central processor also has a 4K-byte memory for cold and warm starts, as well as maintenance test routines.

Master Control Program

The B93 operates under Burroughs' Master Control Program, giving the computer a virtual memory capability and the ability to run multiple programs concurrently.

The system can use five different types of disk configurations that can be mixed and matched. For instance, the B93 can take advantage of the firm's Super Mini-Disk II, a 6M-byte dual-disk drive with an 8-in. flexible media; and Burroughs' disk cartridge drives, which allow a maximum of three for 27.6M bytes of storage.

The system can handle up to two line printers, delivering printing speeds up to 650 line/min. The B93's data communications operate in asynchronous, synchronous and bisynchronous modes, with line speeds up to 38.4 bit/sec.

The B93's Computer Management System (CMS) is terminal-based software and was designed for two-way operator communications, automatic multiprogramming, expanded virtual memory, dynamic resource allocation and I/O control, the spokesman claimed.

Burroughs said its newly introduced B93 was designed to simplify automation of key business functions and integrate DP and word processing operations.

Purchase prices for the B93 start at $37,000, while lease rates begin at about $1,400/mo.

The CMS software, required by the B93, can be licensed for a one-time fee of $2,500 or $100/mo. Complete applications program packages are available for one-time license fees ranging from $1,400 to $19,000, or for $59 to $800/mo. Deliveries of the system are scheduled to begin the second quarter of this year, the spokesman said from the firm's headquarters in Detroit, Mich. 48232.

Kurzweil Boosts Speed 300% On Data Entry Machine Update

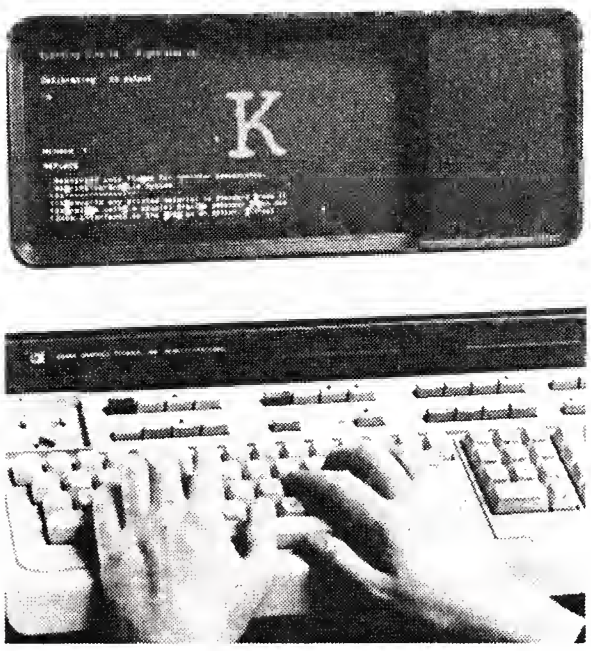
NEW YORK — Kurzweil Computer Products (KCP), a Xerox Corp. company, has introduced a new version of its Kurzweil Data Entry Machine (KDEM) that it said can convert ordinary printed material into digital from up to 25 times faster than a human typing at a keyboard.

The new KDEM's speed has been boosted 300% over the first model introduced two-and-a-half years ago, noted KCP. Its omnifont capability is able to recognize all of the 200 plus typefaces and type fonts now widely used.

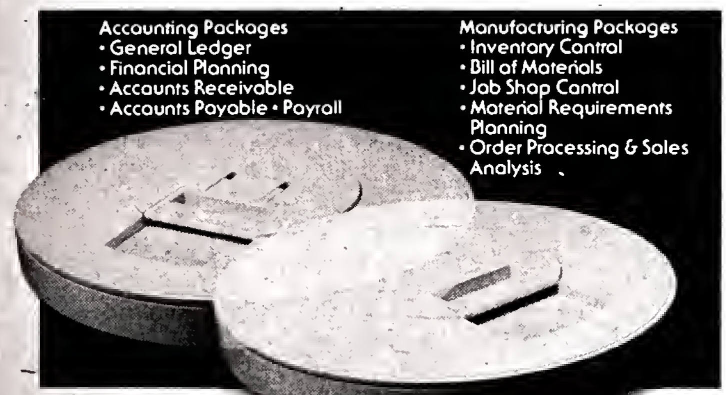
The company explained that now several lines of text are scanned at once, as opposed to the older machine which scanned one line at a time. A specially designed camera is used to transmit the analog image to an enhancement circuit that in turn converts it into digital form. This digital message is then transmitted to a computer within the machine. This process was made possible by new format control software called a Multi-Line Format Controller, developed by the company.

The results of this new capability and increased amount of processing forced Kurzweil engineers to develop a processor based on a family of integrated circuit

(Continued on Page 102)



The KDEM can 'learn' to recognize almost any typeface, Kurzweil said. Characters it does not recognize with certainty are displayed on the CRT screen.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CW/5-4

Tape Shared on HP Nets

RESEDA, Calif. — Qualex Technology, Inc. has introduced an interface that allows its Group 3000 tape systems to be shared among Hewlett-Packard Co. CPUs.

The use of the Shared Mass Archive Storage Host (Smash) is said to allow 6250 tape technology to be shared over a network of CPUs, reportedly providing the advantages of higher recording density, increased throughput and access to a larger, expandable data base.

Switching selection for network CPUs is operator-activated between two, three or four CPUs in any mix of HP Series II, III or Series 30, 33 or 44 computers.

Prices of the unit range from $14,000 to $28,000, depending on the configuration. Qualex is at 6925 Canby Ave., Building 109, Reseda, Calif. 91335.

Printer Handles Multipart Forms

HUDSON, N.H. — Centronics Data Computer Corp. has announced the Model 792, a 120 char./sec serial dot matrix printer designed for general business applications where multipart forms and true-demand document capabilities are essential.

Standard features include an operator adjustable tear-off position that can occur as close as .06 in. from the bottom of the last printed line. It can accommodate forms of varying thicknesses and widths and it features a "7-Meg" ribbon cassette that offers a seven million character life, the vendor said.

The Model 792 can be used with Centronics-compatible minicomputers and costs $2,525, the vendor said from Hudson, N.H. 03051.

KDEM Runs 300% Faster

(Continued from Page 101)

chips called emitter-coupled logic technology, the company said.

The Mac computer, according to KCP, is close to four times faster than the previous processor and is able to execute about six to seven million instructions per second (Mips) compared to 1.47 Mips done on the older model. Kurzweil claims that this new instruction rate is comparable to some large mainframes.

The KDEM now can enter between 20- and 50 char./sec on the average, with top speeds of up to 75 char./sec depending on the original document's print quality and format, the company noted.

Also incorporated into the KDEM is a 40,000 English word dictionary called Lexicon.

Any characters that are not immediately recognized by the KDEM are checked against this lexicon which, according to KCP, decreases the need of operator intervention substantially.

Foreign language lexicons are planned to be added to the KDEM in the future.

The new model KDEM has a document paper feeder and a redesigned workstation. The price for the workstation, scanner, CRT, minicomputer processor with 256K bytes of memory and disk drive with cabinet is $89,000. Low-end configurations of the system start at $59,800.

The KDEM is immediately available for delivery and the company noted that the new work station can be retrofitted into existing KDEM units.

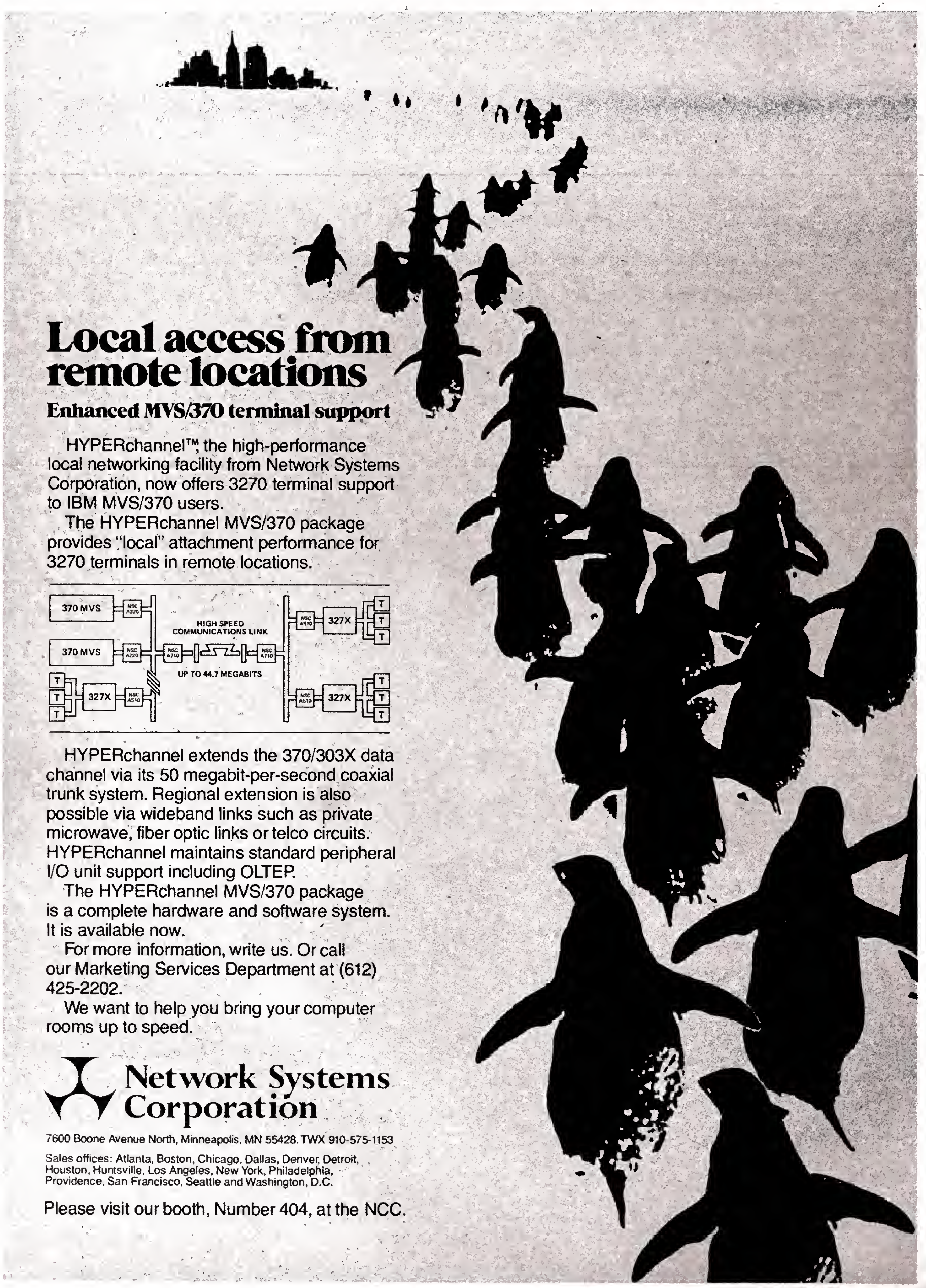
Further information can be obtained from Kurzweil Computer Products, 33 Cambridge Parkway, Cambridge, Mass. 02142.

CDC Drives, Nova Interfaced

ANAHEIM, Calif — A disk controller said to provide compatibility between Data General Corp.'s Nova series system and the Control Data Corp. SMD, CMD, and MMD or equivalent disk drives has been announced by Ardent Computer Products, Inc.

The Model 3000FF controller can interface up to four drives with resulting mass storage capability from 32M to 1.2K bytes. It features onboard error correction, data buffering and optional alternate sectoring, the company said.

With delivery to begin in 30 days, the Model 3000FF is priced at $4,000 from Ardent Computer Products, Inc., 2259 Via Burton St., Anaheim, Calif. 92806.



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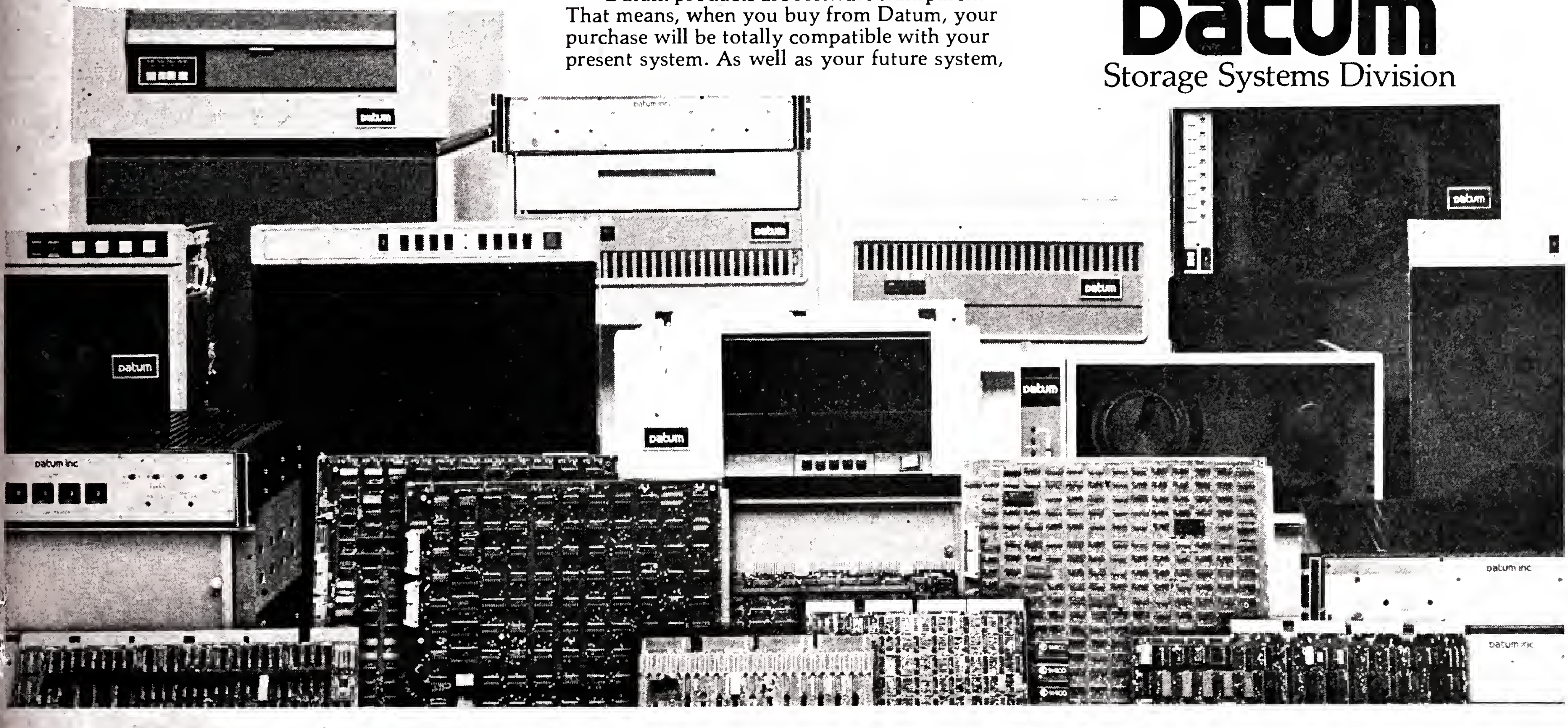

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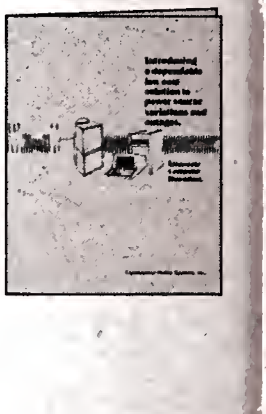

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User Education Paramount

Local Nets: Standards Not the Only Issue

By Robert Batt
CW West Coast Bureau

While most of the recent debate surrounding local-area networks has focused on the contentious issue of standards, some industry experts in Silicon Valley are concerned that other vital problems are not being addressed.

Chief among these is the issue of user education — how to persuade users that local networks are going to play a significant part in the development of future technologies.

Many vendors, keen to emphasize the importance of the local networking concept in meeting ever-increasing multiuser requirements, are worried that preoccupation with the standards controversy is downgrading the exciting possibilities in local networks.

Low-Level Issues

Typical of the comments were those made by Charlie Bass, vice-president of Ungermann-Bass, Inc., a manufacturer of Ethernet-compatible systems based in Santa Clara, Calif.

"Right now people are messing around in what could be called the low-level engineering issues. There are no simple answers or universal solutions," Bass said.

"Clearly there are going to be dominant technologies based on economics, performance or standards issues. The situation will not sort itself out quickly and, when it does, it is guaranteed not to be a single technology or standard."

Bass said there are many technologies to be manipulated which will change over time under the impact of economics. "But today the debate is on the standards issue. The problem is that as long as end users are concerning themselves with engineering problems, they are not focusing on the great distance between that level and the communication services they need to achieve for their business operations."

While the questions about engineering problems were legiti-

(Continued on Page 121)

• *Ethernet Rivals Not All Following The Same Route*

By Robert Batt
CW West Coast Bureau

Ethernet, the local network concept developed at Xerox Corp., has been at the center of debate over standards for several years now [CW, April 13]. It has been accepted by many users as the de facto standard for the industry despite the absence of official endorsement.

However, as several other Ethernet-type networks appear on the market taking significantly different approaches, it has become clear that the matter is far from being resolved.

Take Z-Net for example, the network manufactured by Zilog, Inc. and designed to be Ethernet-compatible. While architecturally both systems are virtually identical, with common bus topology and collision-detection facilities, there

(Continued on Page 114)

• *Major Players In Ethernet Game: Vendor Profiles*

Xerox Corp., Zilog, Inc. and Ungermann-Bass, Inc. are top-runners in Ethernet.

Xerox Corp.

Principal developer of the Ethernet local-area network under the direction of Robert Metcalf, project director, Xerox Corp. has been pouring vast amount of funds into the technology since the inception of Ethernet in 1973.

The aim was to build a 48-bit network that was inexpensive and easy to install, maintain, configure and enhance. Ethernet was designed to attack that 70% of the office market that is not yet automated; Digital Equipment Corp. and Intel Corp. are now also involved with its development.

"Our model has not been the same as Wang's or IBM's, which

(Continued on Page 111)

• *Three Topologies Determine Design Of Local-Area Nets*

By Robert Batt
CW West Coast Bureau

The world of networks can be characterized by three major physical topologies which determine in large part the design of local-area networks and the uses to which they can be put.

The choice of topology — star, ring or common bus systems — regulates each network's method of communicating. Each method has advantages and disadvantages which a potential user must weigh before choosing.

A star arrangement, for example, connects each user to a central facility responsible for managing all communications. The limitations and reliability of the central unit therefore determine all network performance characteristics.

The ring architecture is gener-

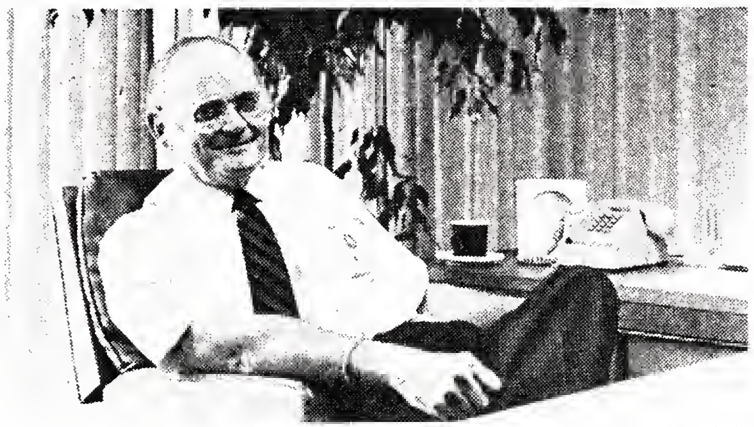
(Continued on Page 118)

Datapoint Looking Ahead To Integrated Office Systems

By Marcia Blumenthal
CW Staff

SAN ANTONIO, Texas — Although Datapoint Corp. is usually considered a leader in the distributed data processing market, executives at the company think that product definition is far too narrow.

"Data processing will be multifunctional," with the same equipment used for several purposes, explained Harold E. O'Kelley, the company's chairman and chief executive officer. And Datapoint's mission is to provide a single system to serve all the information requirements of a business office.



CW Photo by M. Blumenthal

Harold E. O'Kelley

That philosophy was made all the clearer last month when the company introduced its Information Switching Exchange (ISX), a new-generation voice and data private branch exchange (PABX) that provides a single connection for telephones, terminals, word processors and computers [CW, April 6].

Datapoint's augmented presence in the phone business will strengthen the company's position in the information processing market, emphasized Victor D. Poor, executive vice-president of research and development. The company's entry into the phone market was made

(To Page 116)

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W 104

In Major Restructuring

Burroughs Boosts Vertical Marketing

William P. Conlin

DETROIT — In a major restructuring, Burroughs Corp. has strengthened its vertical marketing approach, given wider responsibilities to its Corporate Product Management unit and formed an executive committee that will function as a senior policy-making body.

Under the new plan, the corporate product planning unit will gain full responsibility for all hardware and software planning.

This includes coordinating development of systems with engineering and manufacturing divisions as well as creating new product marketing programs in conjunction with the company's worldwide marketing force.

Until now the corporate product planning activity was confined to identifying requirements for new products and developing marketing strategies.

"Corporate product management will become the integrative organization between engineering and manufacturing and marketing," remarked W. Michael Blumenthal, chairman and chief executive officer.

Heading the reconfigured product planning activity is William P. Conlin, who has been named a senior vice-president. Conlin will retain his former position as head of the International Group until his successsor is named.

At the same time, Burroughs promoted the corporate vice-presidents of marketing groups to presidents of those groups.

The new group presidents are Fred R. Meier of the Business Machines Group, John W. O'Leary of the Office Products Group, Robert J. O'Connell of the Federal and Special Systems Group and Roger W. Johnson of the Office Systems Group.

Opportunities to Advance

Blumenthal said this change creates opportunities for personnel to advance to the vice-presidential ranks within these organizations.

The new structure is reportedly designed in part to decentralize the decision-making process.

In addition, Blumenthal said the Business Machines Group, responsible for DP products in the U.S., and the International Group will restructure their field marketing operations along various vertical market lines during the next 18 to 24 months.

These activities include banking and finance, a variety of commerical enterprises, government, education and health care. Competitors such as Sperry Univac and NCR Corp. already market along vertical lines.

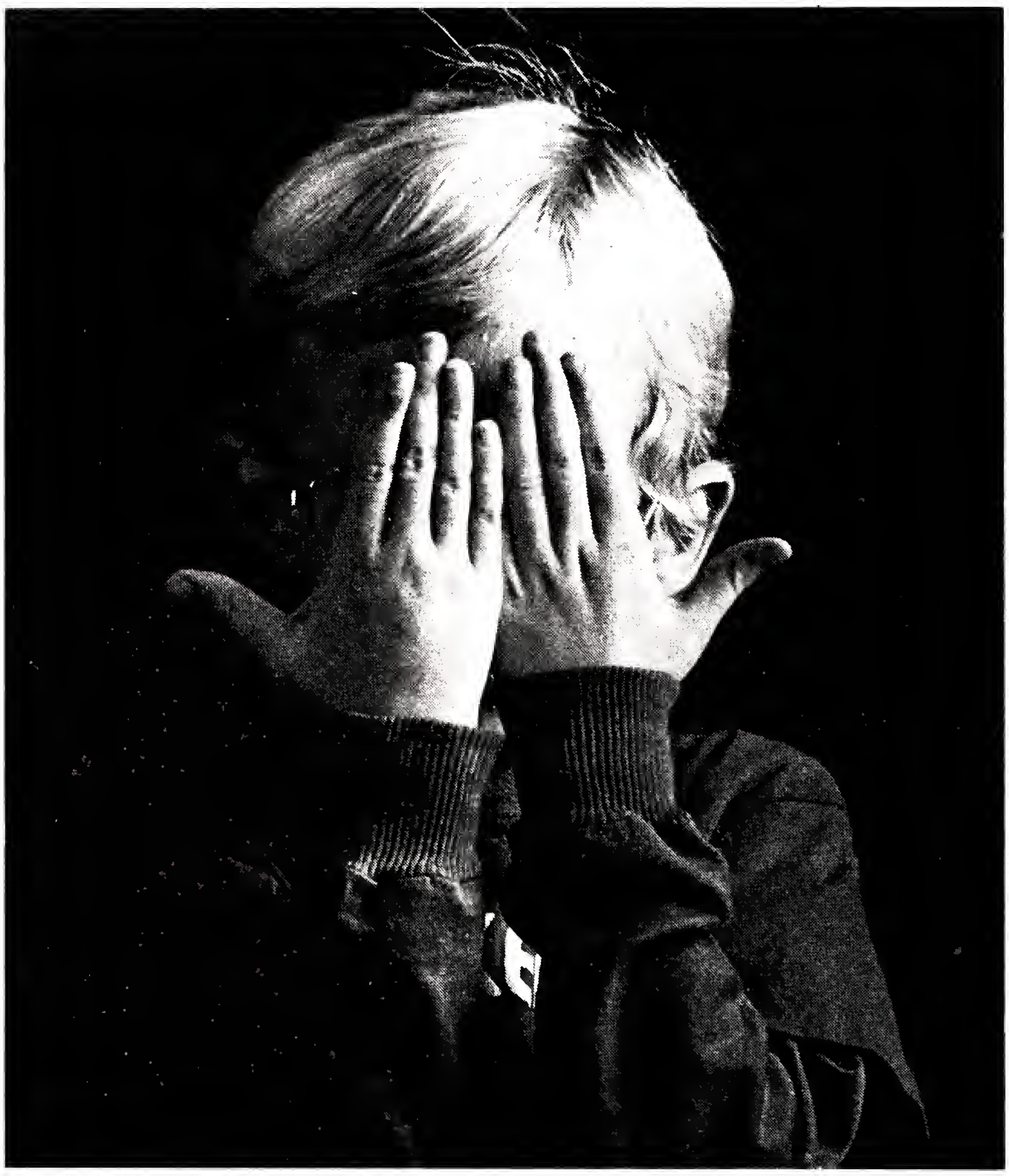
"We want to provide customers with complete and effective solutions to the full range of information problems they face in their respective lines of business," Blumenthal said.

Besides these marketing changes, President and Chief Operating Officer DuRay E. Stromback's responsibilities have been realigned to include product management, marketing, engineering and manufacturing, customer support and product distribution operations.

Blumenthal also announced the formation of an executive committee that will oversee policy development and decision making.

While the Executive Committee consists of the top corporate executives, Blumenthal also has formed a Policy Advisory Committee that will provide senior management on a regular basis with the views of talented managers from many disciplines within the company.

Also included in the reorganization was the Engineering and Manufacturing Group, which was expanded to seven operating units, the firm said.



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But Quarter Revenues Up

Memorex Takes $4.5 Million Loss

SANTA CLARA, Calif. — Memorex Corp. reported a slight gain in revenues for its first quarter and an operating loss of $4.5 million for the period.

The net loss for the period was $7.2 million or $1.14 per share on revenues of $191.3 million. For the comparable period last year Memorex had earnings of $1.1 million or one cent per share on revenues of $184.8 million.

Prior to the effect of a $4.3 million gain from the sale of land, Memorex reported a pretax loss of $8.9 million.

"This is at the low end of the expected range announced by the company March 20, due principally to high revenues in March," noted C.W. Spangle, chairman and chief executive officer.

Memorex said it is continuing to invest heavily in its future. This quarter the firm spent $8.7 million in research and development compared to $8.2 million in the same quarter last year.

Microdata Settles Suit Against Pick

IRVINE, Calif. — Microdata Corp. has settled its 1977 lawsuit against Pick and Associates, Inc. that was filed to restrain Pick from allegedly using and disclosing Microdata trade secrets.

Following the Microdata vs. Pick suit, Pick filed a cross-complaint against Microdata and its board of directors in late 1978 seeking $90 million in damages for alleged antitrust violations.

The settlement agreement required no payment to Pick on the cross-complaint and confirmed Microdata's ownership of the DM512 operating system and Access language, which Pick sold to Microdata in 1975.

The settlement agreement acknowledged that although Pick developed the original DM512 operating system and the Access language, they were renamed and further developed by Microdata to make them marketable.

The Reality system and the English retrieval language marketed by Microdata today have been substantially rewritten and revised.

Richard Pick, chief executive officer of Pick and Associates, acknowledged that the agreement did not grant Pick any rights to use Microdata trademarks, trade names or hardware designs.

The agreement permits Pick entities full and unrestricted rights to own and use DM512 and Access on a nonexclusive basis, provided no action contrary to the nondisclosure provisions of the 1975 agreement take place that would result in placing the operating system in the public domain.

Correction

The March 23 "Mergers/Acquisitions" column may have given the impression that Litton Mellonics Information Center had been acquired as a subsidiary by Elec-Trol, Inc. Instead, Elec-Trol selected Litton as its sole vendor for its DP requirements; the information center remains the major DP center and part of the organization for Litton.

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But what makes this terminal look even better is its price—just $2075.

Drawing the most from your system.

The HP 2622 display station goes beyond the standard low-cost block mode features. With its format mode and optional line drawing sets, you can design forms just like the ones your people are used to working with. And there are two full pages of scrolling memory to help make everything picture clear.

But the HP 2622 is more than just a flashy screen personality. It has a typewriter-style keyboard with separate numeric keypad for quick and easy data entry; eight user-definable soft keys; self-diagnostics for high reliability; even an optional built-in thermal printer for hard copy at the touch of a key.

See how good your system can look with the HP 2622. For an eye-opening demonstration, call your local HP sales office listed in the White Pages. Or return the coupon to Hewlett-Packard, Attn: Tom Anderson, Dept. 398, 974 East Arques Avenue, Sunnyvale, CA 94086.

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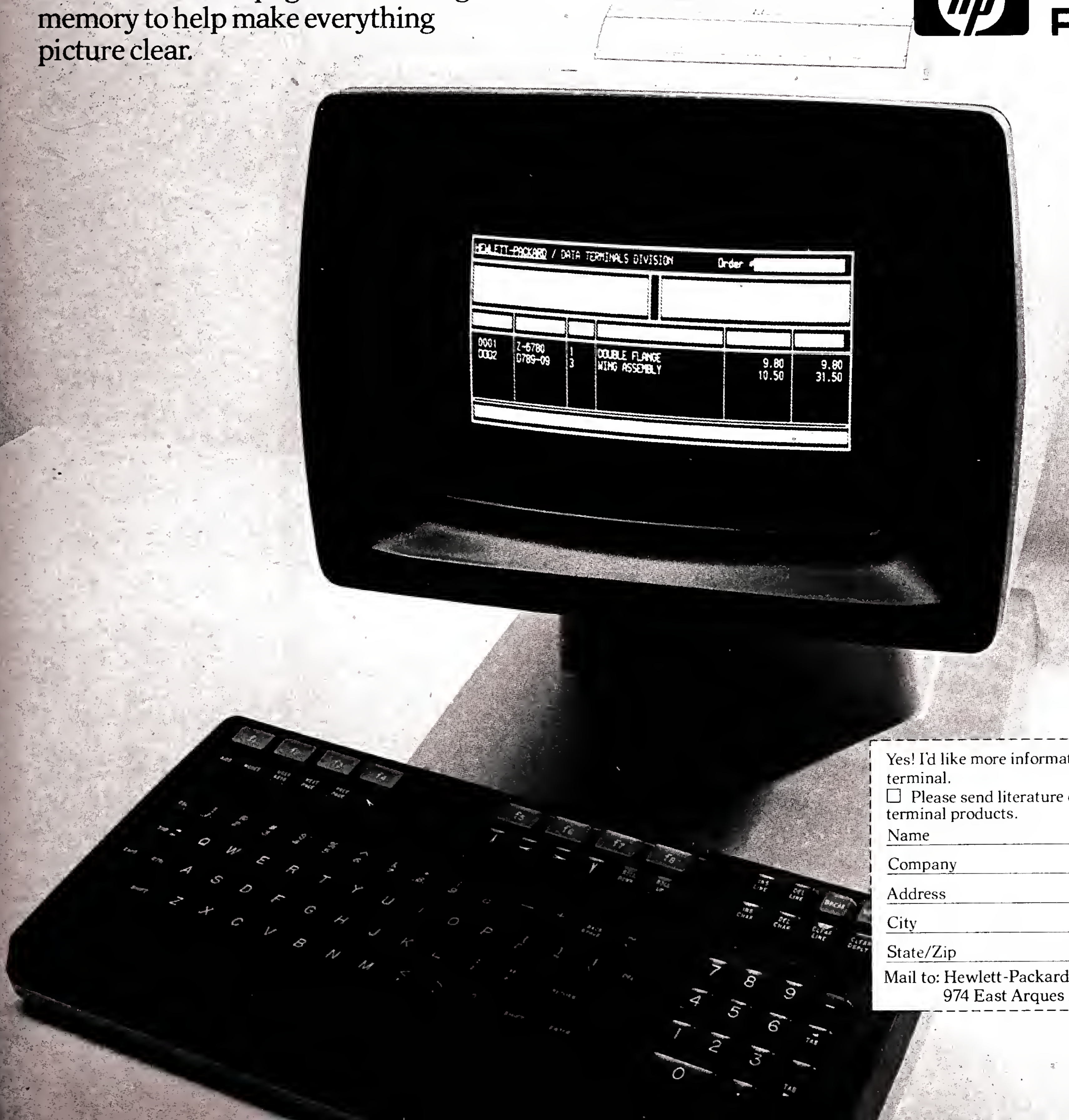
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IBM Denies Matsushita Deal

TOKYO — IBM has denied it will enter an agreement with Matsushita Electric Industrial Co. to supply computer systems, but industry analysts said the firm has not ruled out the possibility.

While IBM said it has no plans to buy business or personal computers from any Japanese firm, industry analysts believe IBM has not ruled out the possibility of Matsushita's providing processors that could be used as part of larger computer systems.

Another possibility, analysts theorize, is IBM may be looking to strike up some sort of joint development deal or a partnership with Matsushita for a low-end mainframe processor or minicomputer, or for a smaller processor in the $6,000 to $7,000 range — possibly similar to IBM's 5100 line.

Rumors Discounted

However, Gartner Group analyst Tom Crotty said he has discounted rumors of a pending IBM deal with Matsushita.

IBM does, however, use Japanese firms to supply some of its copiers. Matsushita also supplies IBM's 3101 CRT terminals.

Supershorts

Lifeboat Associates, a major supplier of computer software, has announced the opening of an office in Tokyo. The company will offer software for both American-made computers in Japan and computers of Japanese domestic manufacture.

— — —

Datum, Inc. has been awarded the president's "E" award for excellence in export. The purpose of the award is to recognize companies that have demonstrated outstanding efforts to increase U.S. exports.

— — —

Tymnet, Inc. has announced the installation of the first experimental 10.5 GHz band Digital Termination Service local distribution node in San Francisco. The installation follows on the heels of a Federal Communications Commission (FCC) ruling this past January, which would reallocate the RD spectrum in the 10.55 to 10.68 GHz band for digital electronic message service. Formal issuance of the FCC ruling is pending.

— — —

Genesee Computer Center, Inc. has made plans to become a software house. In its first 12 years of business, Genesee has concentrated on scientific and engineering computing services, with emphasis on optical design computing and thin-film computing services. They will soon offer the programs to provide these services.

— — —

Turnkey Sales & Leasing, Inc. has announced its formal entry into the office systems consulting arena.

— — —

John Cullinane, chief executive officer of Cullinane Data Base Systems, Inc. has been voted the winner of the Joseph Wasserman Award for 1981. The Wasserman Award is given annually by the New York Chapter of the EDP Auditors Association to honor outstanding achievements in EDP auditing.

— — —

Interaction Systems, Inc. and Lear Siegler, Inc. have entered into a marketing agreement to jointly promote touch-sensitive CRT terminal add-on kits developed and manufactured by Interaction and designed specifically for use with Lear Siegler CRT terminals.

— — —

As part of their long-term agreement on specialized telecommunications integrated circuits, National Semiconductor Corp. and Harris Semiconductor announced plans to produce CMOS codec/filter mono chips to common pinout standards. The standards are those developed by National and Eurotechnique, which were adopted by the French on April 7.

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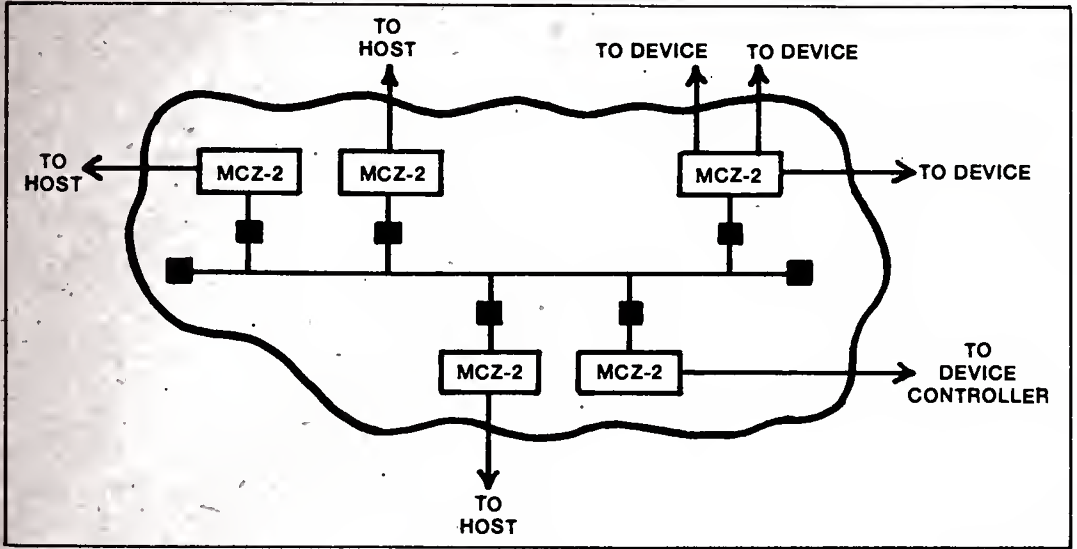

Source: Zilog, Inc.

Z-Net Local-Area Network

Ethernet Players Profiled

(Continued from Page 105)

have concentrated on the clerical side of office work with their word processing systems. Rather, we are concentrating on those executives and professionals whose job it is to create and communicate policy," Robert S. Printis, a Xerox systems development manager, pointed out.

Operating from its Palo Alto, Calif., research center, Xerox systems designers took more than 10 years to build up the Ethernet system from scratch using the specialized software needed for office-type operations. Today there are 43 Ethernets connected to each other worldwide, with 1,200 computers connected to them.

"We think this system will allow offices of the future to link up in a very serious way," Printis added. Responding to criticisms that Ethernet was failing to address the problems of higher level protocols, Printis said the right approach was to provide a service and to allow the user to give feedback.

"Ethernet gives you coexistence with other networks. We have only proposed standards at the data link level, but that doesn't mean we are thinking about standards at the higher levels also," he said. Printis argued that to concentrate on certain areas such as higher level protocols was the wrong approach. The philosophy of Xerox was that everyone could have access to the network.

"We don't believe in priorities here — it adds complexities. Priorities often mean you underengineer your network," he said.

Zilog, Inc.

Manufacturer of Z-Net, Zilog, Inc. has announced its intention to make its network compatible with Ethernet. "Our commitment to Ethernet as the emerging local-area network standard is clear," said Manny Fernandez, company president.

"We are already developing new VLSI (very large-scale integration) chip-level technology in parallel with the emergence of Ethernet. We intend to develop Z-Net to Ethernet 'gateway' products that will enable installed Z-Net-based systems to migrate upward for future implementations. And we will provide microcomputer system products that are Ethernet-compatible," he added.

Zilog intends to build Ethernet components and chip-level products that will easily interface computers to an Ethernet network by designing them for a set of subsystems desired by users.

To aid the widespread implementation of local-area network products in the next few years, Zilog says it will license its network technology, both software and hardware products. It intends to make available its kernel and protocol software, and perhaps at a later date its operating system.

"The timing of this strategy is important. Two issues will delay the availability of Ethernet systems outside the Xerox-DEC-Intel world — firstly, the cost of the interface and, secondly, the lack of high-level protocols," Dale Way, product marketing manager, said.

Z-Net has adopted what is termed an "intelligent local network" approach. As can be seen from the diagram above, the host computer taps into a Zilog MCZ-2 microcomputer system via a standard RS-232 serial port, using either asynchronous, bisynchronous or Synchronous Data Link Control (SDLC) protocols.

The MCZ-2 system handles both network access control and, using a packet-switched approach, message management. A standard coaxial cable provides the physical link between the stations. The cable is connected to each station via a transceiver.

"What is important about this technique is that each Z-Net node or station — that is, every Zilog MCZ-2 microcomputer — handles the functions of network access and data management," Fernandez said. "All stations on the network are peers, and access control is fully distributed among the stations which communicate as equals."

According to Fernandez, this peer-to-peer communication has implications for the issue of compatibility within a network that affects Z-Net or any other intelligent network approach.

"In a nutshell, intelligent peer-to-peer communication requires a fixed set of conventions that addresses all the communications functions necessary to service a given application. These conventions, or protocols, must be the same in all network stations that wish to communicate," he added.

Ungermann-Bass, Inc.

Founded in July 1979 by ex-Zilog people, Ungermann-Bass, Inc. has adopted a distinctive business strategy with respect to local-area networks. "We see this market evolving from a technologically based product to a service-based one. Our strategy is to manage this technology in such a way that most of the issues are

(Continued on Page 112)

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Major Players in Ethernet Game Profiled

(Continued from Page 111)

transparent to the user, Charlie Bass, vice-president, said.

Ungermann-Bass has been careful not to wed itself to any one technology believing that there will be a multiplicity of de facto standards in this area over the next few years. "We have built a product — Net/One — with a specific set of technologies, but we are not married to any one of them. We see them as building blocks to be manipulated and integrated over time," Bass added.

The company believes that such an approach will give the user services that over time are consistent, embellished and more friendly. "We think that to be experts in the technology, but not to be enamored with any one particular technology, is a flexible and powerful position to be in," Bass said.

According to Ungermann Bass, Net/One allows local communications to be managed between all sorts of computer-related devices such as printers, hosts and modems and therefore providing an alternative to the X.25 protocol at the local level.

Using a network interface unit, Net/One was designed to provide both virtual circuit and datagram services. With virtual circuit, the company claims any two parties can be connected and the network is transparent to them.

"It looks like a full-duplex channel," Bass said. "In this mode the product looks like a distributive switch, with flexible, high-speed communications. Many users are using it as a way for a single terminal to address multiple hosts, connecting up data processing, word processing and modem systems and connecting out to time-sharing systems or even public networks," he added.

Datagram Mode

In its datagram mode, a message is transmitted to the interface unit and passed through the system. In this type of service, Net/One looks like a network. This method is used for host-to-host communication when the user wants to build up higher level protocols.

Typically, the company said, the virtual circuit facility is used mostly by end users, and the datagram service is more OEM-oriented. The first Net/One system was delivered in July 1980, and since then there have been some 30 installations among universities, research labs and systems integrators.

On the issue of cross-vendor communication, Bass said X.25 is the important aspect. He concluded, "It will be difficult for two vendors to talk to each other until they agree on a common protocol."

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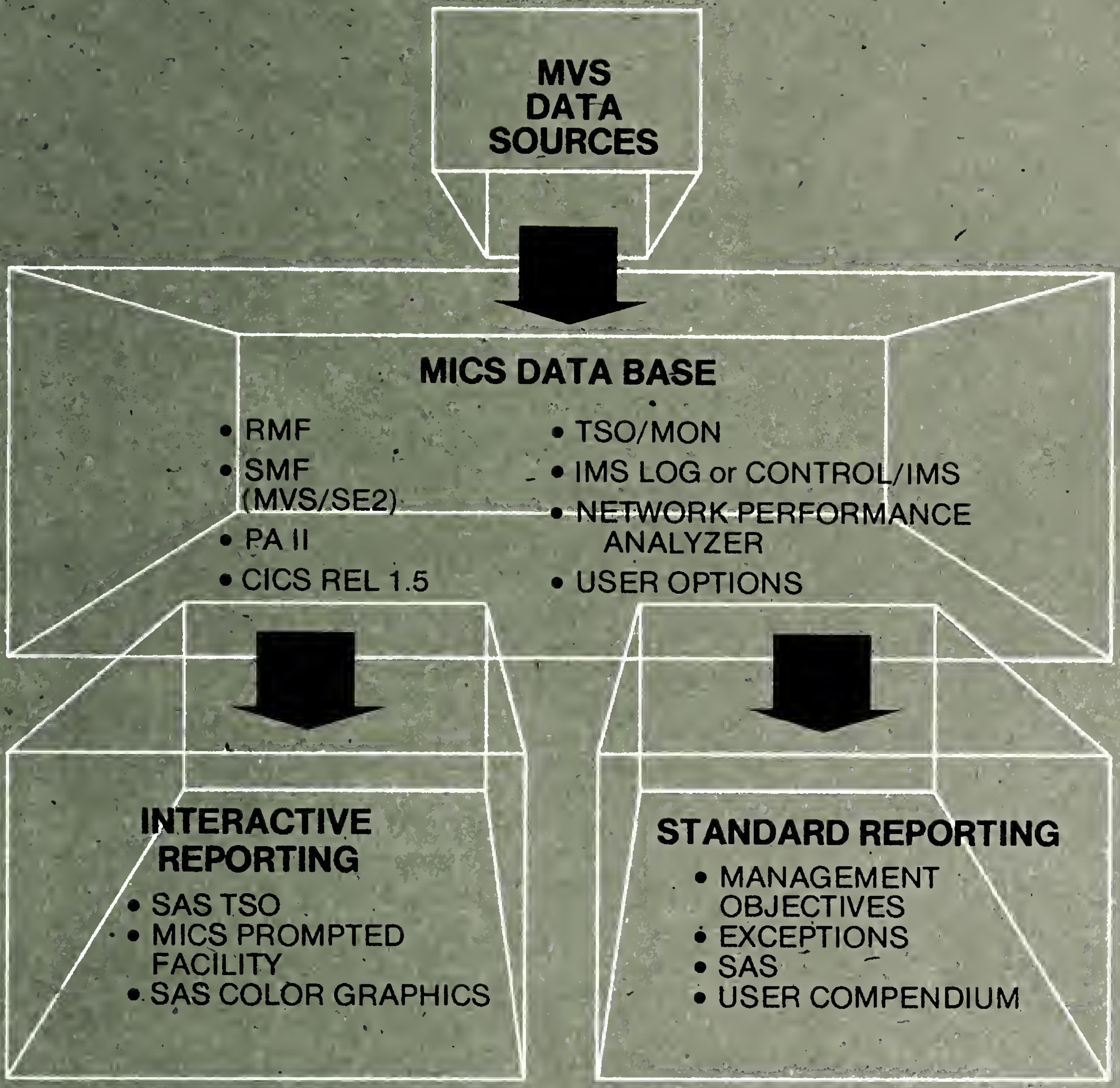

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Ethernet Rivals Taking Different Approaches

(Continued from Page 105)

are important differences in their implementation.

But in the area of high-level protocol software, the approaches of Z-Net and Ethernet are quite different. Ethernet was designed to define the two lowest layers of an overall network architecture, namely, the physical and link layers. It does not specify the higher level protocols needed to provide a complete network architecture, including functions such as internetwork communication, error recovery and security measures such as encryption.

In other words, the main function of Ethernet is to provide a capability for coexistence with other networks, leaving much of the higher level design to the user.

This approach has been criticized by Zilog. Dale Way, product marketing manager, called Ethernet "a kit without parts." Zilog said it will license the hardware and software design of its Z-Net products in unbundled form to prepare the user community for future standards.

"Intelligent peer-to-peer communication requires a fixed set of conventions that addresses all the communications functions necessary to service a given application. These conventions, or protocols, must be the same in all network stations that wish to communicate," Manny Fernandez, Zilog president, said at a recent conference.

While agreement on a physical connection protocol and on how data can be passed does not necessarily handle functions at the higher levels of open systems architecture, Fernandez said, compatibility is dependent on such higher level protocols as well as on the lower levels.

"Those who are working on standardization have just touched the tip of the iceberg. The higher level protocols for local-area networks have not yet been addressed, and it is safe to predict that a comprehensive standard is at least a few years away," he added.

Building Blocks

Another way in which the development of Ethernet and other Ethernet-type standards diverge is in the building-block approach. Ethernet emerged as an attempt to define what the ideal network would look like, then setting down the specifications and building a system to implement such a network.

For smaller start-up companies, lacking the financial resources of Xerox, Digital Equipment Corp. and Intel Corp., the cost of such an approach is prohibitive. So companies like Digital Microsystems, Inc. of Oakland, Calif., for example, have concentrated on using the best of currently available technology compatible with Zilog Z80A microprocessors.

Roy Bettenhausen, marketing director for Digital Microsystems, said: "From the beginning we felt the way to fully utilize the abilities of microprocessors was via a network operation in a distributed systems environment.

"To implement this strategy we used as many existing standards and components as we could and tied them together.

"The existing lack of standards in the local-area networking area does not hurt us because we have looked to existing standards for components and used them to implement a network," he added.

Despite these differences in approach, most network vendors in California's Silicon Valley are urging a speedy resolution of the standards controversy.

Said Ken Morse, vice-president of marketing for an Ethernet-transceiver vendor, 3 Com Corp., "We have decided to support Ethernet as the industry standard. If the IEEE came up with another standard, we would be reluctant to go with it."

But, he warned, "Vendors who are resisting Ethernet are shooting themselves in the foot . . . They are electing to fish in a pond that is not going to grow very fast, while the Ethernet pond is going to grow rapidly."

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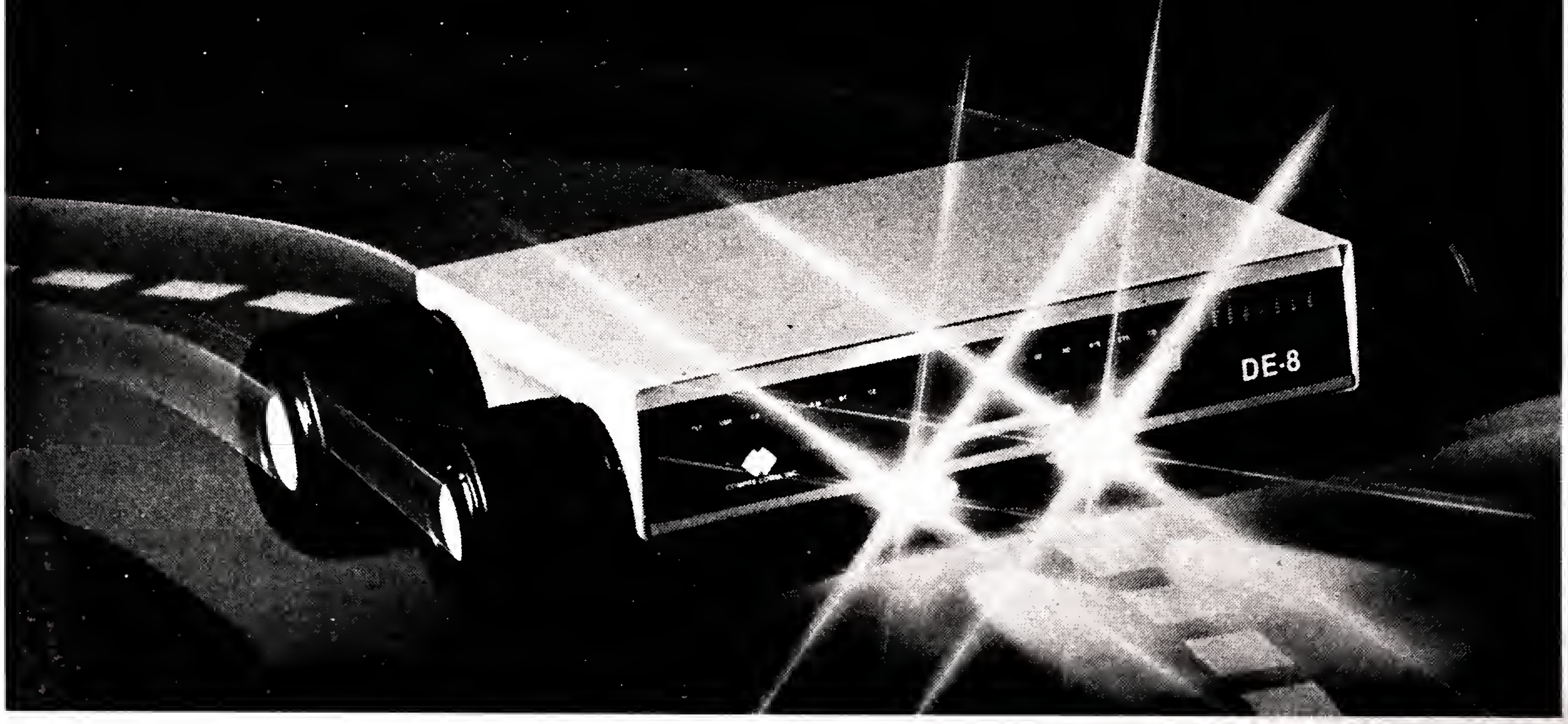

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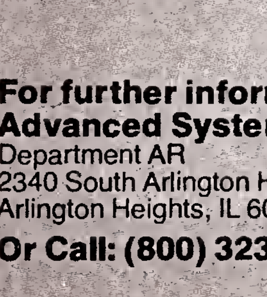

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Datapoint Looking to Future Business Office

(Continued from Page 105)

in 1976 with the introduction of its Infoswitch call distributor system.

"We began to see the bigger, integrated office system when we got into the communications business," O'Kelley noted. Moving along this pathway, two years later the company integrated Infoswitch with its Attached Resource Computer (ARC) local network system, creating one of the first combined voice and data systems. During 1979 its Integrated Electronic Office system software including a message switching capability was introduced.

To provide users with a totally integrated office system, the vendor has to have control of the phones. Moreover, the cost of developing interfaces is so high it will exceed the cost of the system if parts of the system come from different vendors, Poor maintained.

Weak Links

Although the company's integrated business strategy is well on the way to fruition, Poor sees some weak links that must be remedied. The cost of printing in a computer and the cost of storing documents on computer media must be radically reduced, Poor emphasized.

Poor thinks there will always be a place for a mainframe within a large organization, but most mainframes are used in a way that is foreign to the workings of an office and have too much power for most applications. Users need to share data, but not a central computer; and the local network is the key to dismantling the central computer.

Datapoint has been using its ARC system internally for five years. Its workhorse 3800 desktop units are highly visible on desks throughout the company, including those of top management. O'Kelley said the company disperses 350 to 500 electronic messages among many of its 40 locations around San Antonio.

The ARC system is most suitable for heavy DP applications, while ISX is geared to low- and medium-volume applications at the user's desk, according to James R. Carreker, vice-president for development for office communications systems.

When sandwiching electronic messages between long-distance calls there is no increased telecommunications cost and this is when the user realizes the benefit of an integrated system, he maintained.

However, Datapoint does not expect to see the integrated office approach become prevalent for about five to 10 years. Meanwhile, the firm starts its integration process at the user's level of preparedness.

CW Photo by M. Blumenthal

Victor D. Poor

One such user is United Services Automobile Association (USAA), the largest private employer in San Antonio. Currently the company is using an ARC system in conjunction with three IBM mainframes. USAA became interested in ISX and is considering installing a large system.

The keen response to ISX has been scary, Poor said. Market acceptance of the company's products has usually been gradual. That was the case with the ARC system, introduced in 1977. After four years Datapoint has installed only 2,000 ARC systems, but expects to ship tens of thousands of them in the next four years.

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components of its integrated business system in place, the company is poised for fast growth.

For its last fiscal year, revenues were $318 million and O'Kelley expects sales of $400 million this year. During the past five years the company's revenues have grown 47% and earnings per share 39% on a compound basis, one analyst noted.

That growth has been reflected in the company's changing corporate structure. Prior to the $100 million revenue point, O'Kelley ran the company as one profit center. However, after that point O'Kelley reorganized along divisional lines and later delegated authority even further, creating chief operating, technical and marketing officers and forming groups of divisions. "If the person at the top maintains control and doesn't delegate, the company will reach a point where it doesn't grow," noted O'Kelley, whose style is relaxed and even-tempered.

O'Kelley said the company is now structured to accommodate growth to about the $2 billion point.

Although executives at the company are watchful of competitors like Digital Equipment Corp., Xerox Corp., AT&T and IBM, they feel none of these companies yet have all the pieces of the integrated system in place. O'Kelley said the company does not presently find it difficult to compete against IBM because Datapoint's products add value to IBM's systems.

Cramps in Datapoint's Style

SAN ANTONIO, Texas — The broad range of Datapoint Corp. systems — word processing, telephone and data processsing — have required the company to market to different entities within the user's organization.

This has created a certain softness in the domestic market for Datapoint recently.

"Our product line cuts across various parts of the user's company, making the decision process both more complex and longer," Datapoint's chairman and chief executive officer, Harold E. O'Kelley, said recently. To combat this snag Datapoint is currently beefing up its sales force. Last July the company had a sales organization of 200; today the sales force numbers 450.

CW Photo by M. Blumenthal

Edward Gistaro

Another cramp in Datapoint's style has been its international marketing. Until recently the company sold its products overseas through TRW, Inc.'s distribution arm.

Revenues from foreign sales last year were about 27% of total revenues, far less than Datapoint would like, noted Edward P. Gistaro, executive vice-president of corporate development. Although Datapoint had no intention of renewing its 10-year marketing pact with TRW, set to expire in 1983, the firm did not want to leave a void in its foreign sales representation.

In March Datapoint announced it would purchase TRW's Datapoint distribution network for between $109 million and $117 million. The firm will have an equity position in 11 of the 20 overseas distributorships.

The decision was a strategic, not a financial, one, Gistaro explained.

Lease Base

The dedicated sales force overseas is expected to generate a substantial lease base in Europe. Virtually all foreign sales are purchase, whereas in the U.S. Datapoint has an 80-20 lease/purchase ratio.

Another strategic move was the recent acquisition of the preferred stock and 39% of the common stock of Inforex, Inc., which provided Datapoint a lease base, international marketing capability and a noncompetitive product line that is staid, but has staying power, Gistaro noted.

Inforex recently announced its System 9000 at the Hanover Fair in West Germany, which works with Datapoint's mainstay Datashare dispersed processing system.

Datapoint expects Inforex to develop other software that will make Inforex products compatible with Datapoint systems.

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Three Topologies Define Local Network Design

(Continued from Page 105)

ally considered to be simpler than the star and thus a less expensive way of connecting processors. It eliminates the possibility of central facility bottleneck.

However, with the ring topology, overall network responsibility depends on the reliability of each connection. Because messages circulate in only one direction, a break in the ring at any point disables the whole network. Hardware is needed to keep the network functioning in the event a node fails.

The bus approach, chosen by Ethernet and most Ethernet-compatible systems, uses passive connections, making reliability of the nodes less essential. In addition, simpler transmission hardware can be used to access the bus.

Consequently, this architecture is generally considered to allow the simplest, least costly and most reliable implementation. It is also thought to be the most suitable architecture for office-of-the-future technology.

According to Charlie Bass, vice-president of Ungermann-Bass, Inc., while the topology selected determines many network issues, it is basically independent of the transmission medium.

"Ultimately, local networks will use an assortment of whichever media are technologically appropriate to a given application. They will include optical-fiber as well as coaxial cable and twisted wire pairs and eventually cable television, radio and infrared transmission as they show promise," Bass said.

As distributed processing continues to burgeon, the proprietary local network is likely to become less useful because of the incompatibility of the differing DP systems. Hence the need for local-area networks.

The topology of the Ethernet systems is that of an unrooted tree. It is a tree that can branch at the entrance to a building's corridor, yet avoid multipath interference.

There must be only one path through the Ethernet between any source and destination. If more than one path existed, a transmission would interfere with itself, repeatedly arriving at its intended destination having travelled by paths of different length.

Unrooted Net

The Ethernet is unrooted because it can be extended from any of its points in any direction. Any station wishing to join an Ethernet taps into it at the nearest convenient point. In this sense looking at the relationship of interconnection and control, Ethernet appears to be the dual of a star network.

Rather than distributed interconnection through many separate links and central control in a switching node, as in a star network, the Ethernet has central interconnection through the Ethernet and distributed control among its stations.

Because distributed processing capabilities are so essential, particularly in the integrated office technology environment, the common bus architecture needs to adhere to some stringent performance criteria.

According to Dale W. Way, Zilog's product manager, a local net should be relatively easy to install, should respond to expansion and change, should have robust qualities so that any failure is contained and does not have traumatic consequences and should have a high degree of connectivity.

It should also be cost-effective and have enough nodal capacity to manage the needs of the user. In the evolution of its Net/One system for multivendor, distributed processing environments, Ungermann Bass said it is attempting to meet the user's applications on its own terms so only minimum changes are required in the users hardware and software.

"Any strategy that involves changing the operating system, for example, is going to be limited," Bass said .

That the network needs to be unusually reliable is beyond doubt. As Bass put it, a local-area network "is effectively the glue between a whole host of equipment. It should be more reliable than anything connected to it."

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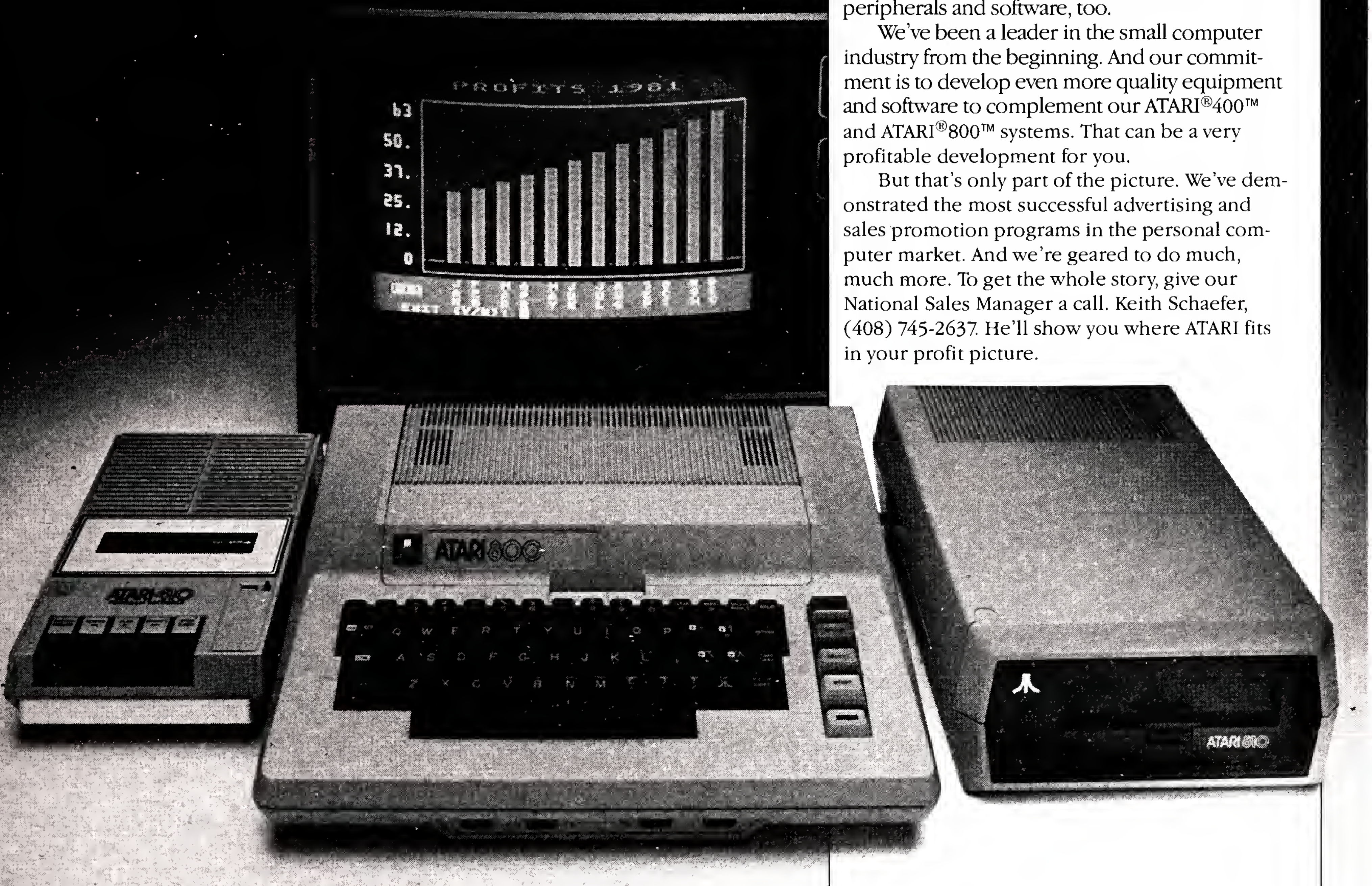

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Standards Not Only Issue in Local-Area Nets

(Continued from Page 105)

mate, Bass stressed, they don't address the customers' real problems.

"Take Ethernet, for example.The technology is such a low-level issue, but most users think they can go out and buy Ethernet and so provide themselves with a local network.

"The problem is it doesn't describe how the parties will talk to each other — it's simply a model for peaceful coexistence between devices," Bass continued. "So while Ethernet is fundamental to the history of this technology, users are going to be disappointed when they find out they can buy a chip from Intel and it cannot communicate with a DEC or Xerox device."

Intel Corp., Digital Equipment Corp. and Xerox Corp. are the codevelopers of Ethernet.

Start-Up Firms

The problem of educating users about what is available is particularly apparent for small start-up companies trying to establish a niche in one particular area of the local network market.

One such vendor is Digital Microsystems, Inc. of Oakland, Calif. The company, specializing in the manufacture of networks for Zilog-based microcomputers, said it is faced with the problem of how to educate dealers and users to make the most efficient use of systems.

"Our task is to transform the thinking from the microprocessor mode where user facilities are limited to an environment where each time you add a user you increase the computing power available," Roy Bettenhausen, marketing director, said.

Digital Microsystems, through its product Hi-Net, is attempting to reach two distinct markets. First is the traditional microprocessor user, which operates in a multiple environment with three or four other users.

"In this market, a network system is more expensive than the traditional shared micro system. The educational problem lies in showing these users that the capabilities of a local area network vastly expand the traditional micro marketplace and that when you get above the three or four user environment, there is no question that the only solution is a networking one," Bettenhausen said.

This process of disassociating from the traditional microprocessor solution carries over into the company's second market — enabling low-end systems to extend the product line of minicomputer dealers such as DEC or Data General Corp. Here the education problems to convince the user that the network turns the micro into a complete and powerful solution that is a viable business system that adds to their range, Bettenhauser explained.

"We need to change the thinking of the minicomputer dealers and convince them that such a network is not a hobbyist fad, but rather it means they do not need to turn down potential sales," Bettenhausen said.

Another company attempting to effect some change in thinking is Nestar Systems, Inc., a Palo Alto, Calif., vendor of Apple Computer, Inc. microcomputer networks. Nestar is attempting to convince data processing users in large corporations that its Cluster/One Model A product provides a total systems solution.

Harry Saal, founder and president of Nestar, explained the main problem they face is "lack of acceptance by a large number of candidate installations that an inexpensive personal microcomputer can have a value in large business networks.

"The user questions its role and it's hard to get a foot in the door and talk to them. Once we show them what the system can do we are halfway to completing a sale."

Many local-area network manufacturers in Silicon Valley believe more focus on educating users about networks will produce a rapid shift in network use and make a major contribution to solving some of the thorny technological problems still outstanding.

They believe the market is already there, with users who are planning their long-term communications technologies ready to take the first steps. In this sense small start-up companies are vital because as they emerge with a growing market they can have a greater effect on developments than in more traditional technologies.

"In a few years users will want a single vendor to solve all their communications needs because with all the investment they will make, it will be more cost-effective to deal with one supplier," Charlie Bass said.

Not all agree with this view. Harry Saal claimed the user is looking to buy a complete system, but not necessarily from a single manufacturer.

Most network specialists agree, however, that users have never felt comfortable in a mixed vendor environment where it is difficult to isolate a problem and get the right vendor to respond quickly.

Genuine cross-vendor communication is therefore something urgently needed by users, the vendors claimed. As Ken Morse, vice-president of marketing at 3 Com Corp. of Menlo Park, Calif., put it: "End users are fed up with vendors jerking them around. They want to be able to mix and match efficiently."

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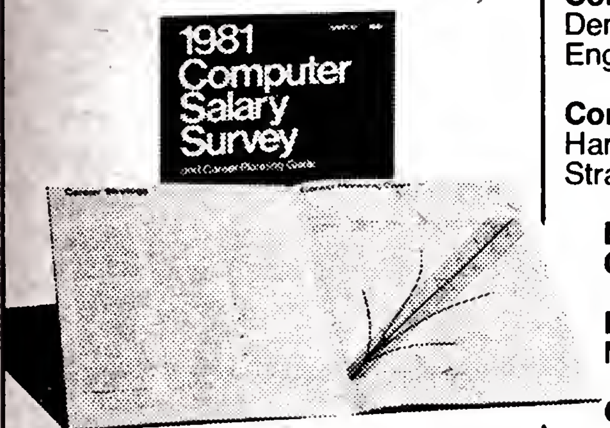

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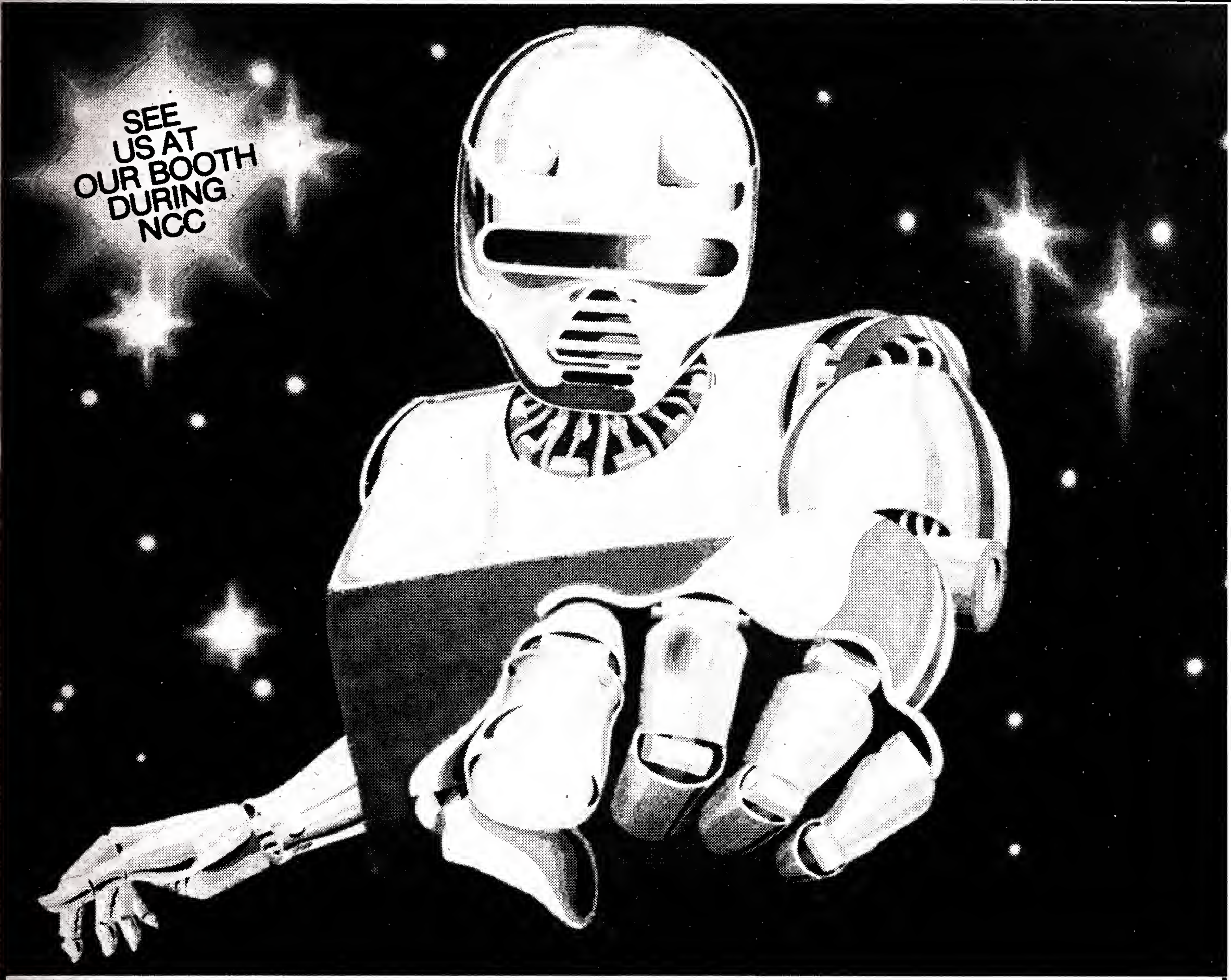
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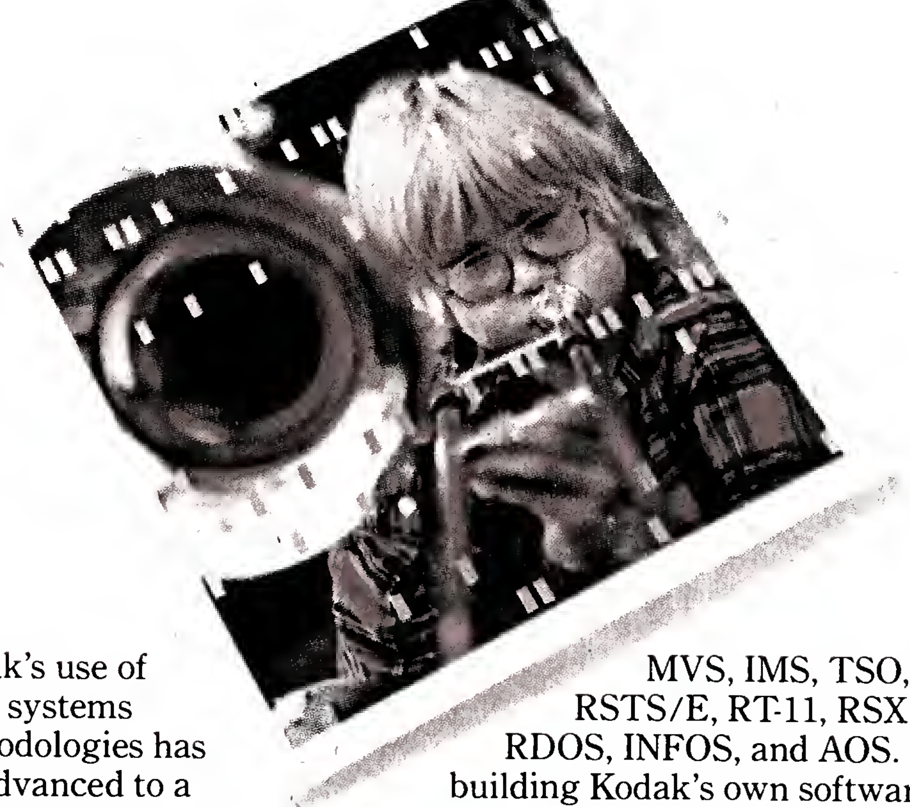

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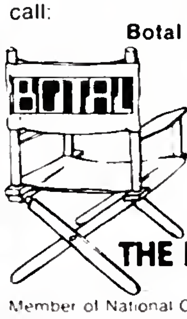

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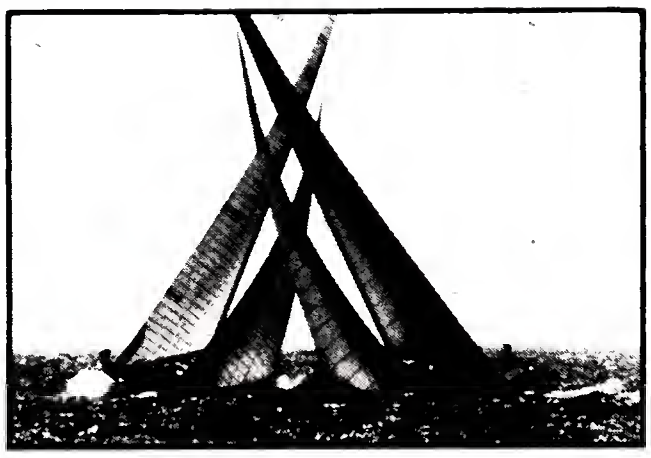

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Tandem Engineers and Analysts work in small groups with other top-level people, deciding independently what directions to take, and then accepting the responsibility for carrying these decisions out. Responsibility at Tandem passes to the most capable individuals, who manage their own careers consistent with their desires and abilities.

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- **Processor Microcode & Microcode Development Tools**
- **Computer System Performance Evaluation**
- **Data Communications & Computer Networking**
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To be effective in the above positions, you should have at least three years of directly related experience. An applicable degree is desirable, but not essential. Proven ability and talent are the most significant qualifications.

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Documentation at Tandem is considered an essential part of the development process—not a follow-on after-thought. For this reason, you will be a member of a small development team working on projects from inception through completion. A minimum of five years technical writing experience in operation systems, data communications or data base management software is required.

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Tandem's integral self-diagnostics package and innovative architecture provide a solid technical basis for an outstanding field service organization. Growing with Tandem's expanding customer base, we have opportunities for Field Systems Analysts in the following areas:

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Field Systems Analysts and Sales Representatives should forward your resume to **Tom Vezina, Regional Systems Manager, Tandem Computers, 1 Penn Plaza, Suite 4334, New York, New York 10019.**

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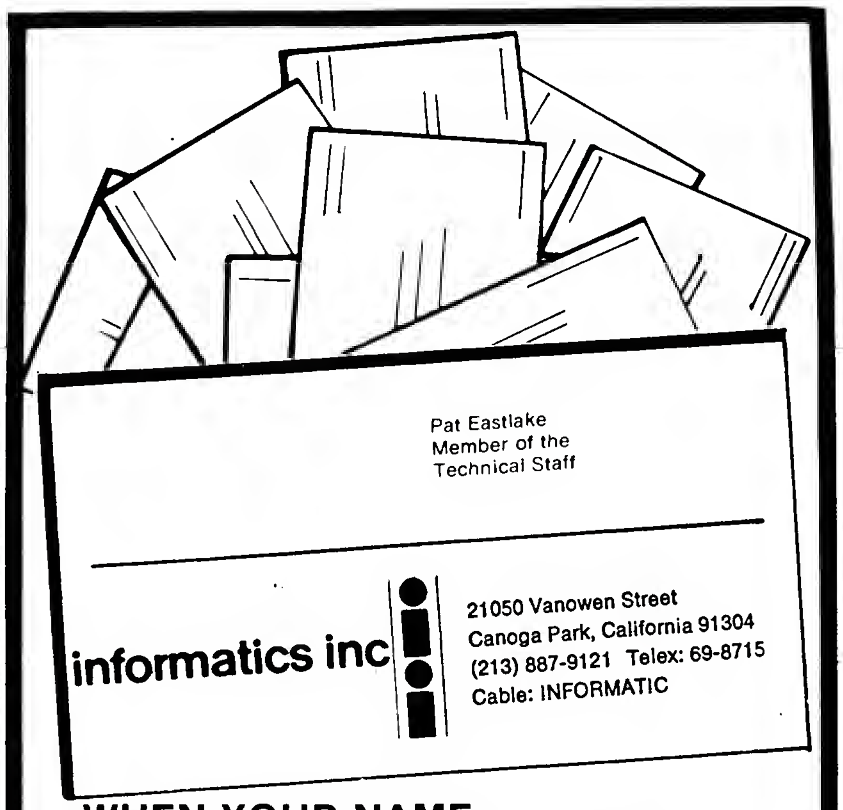

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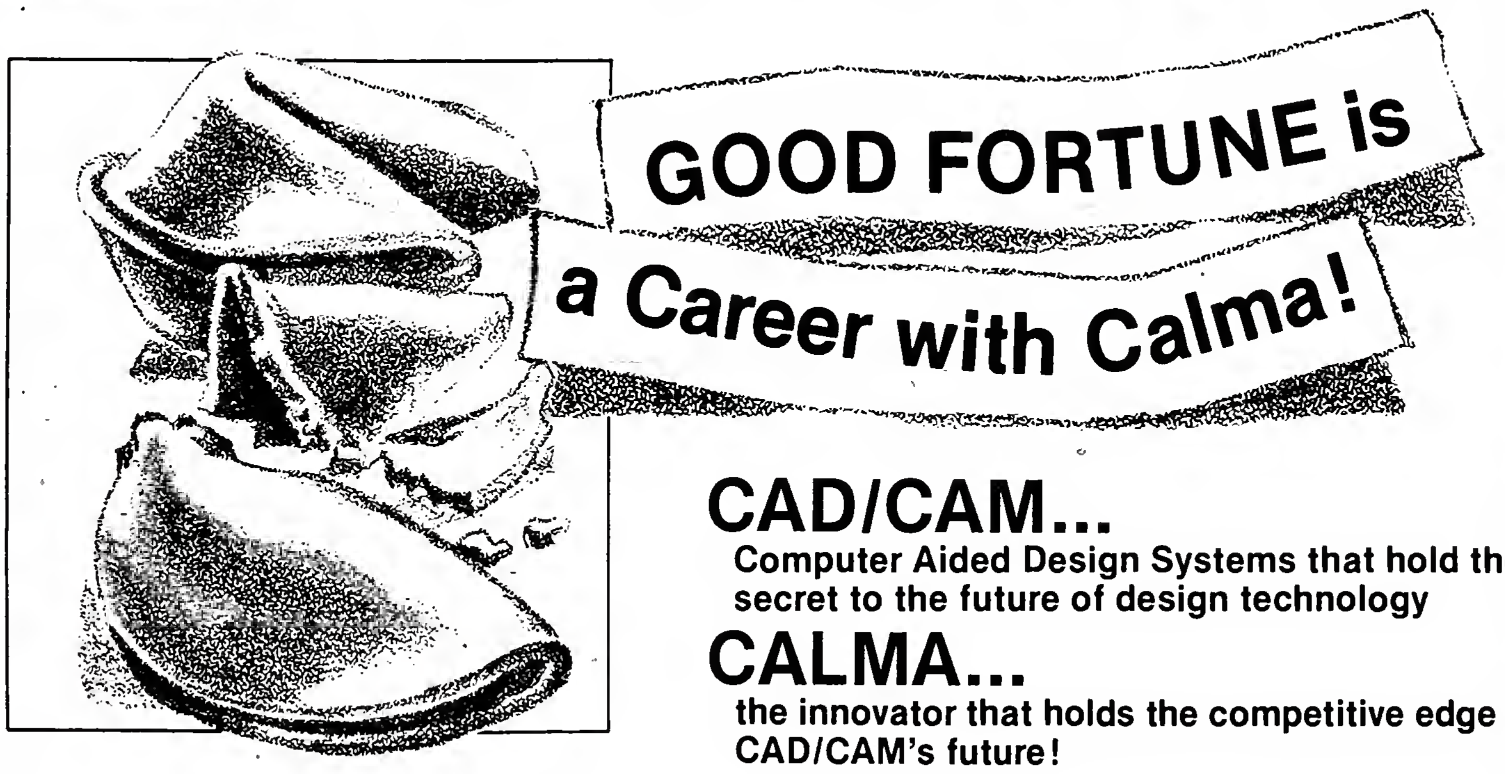

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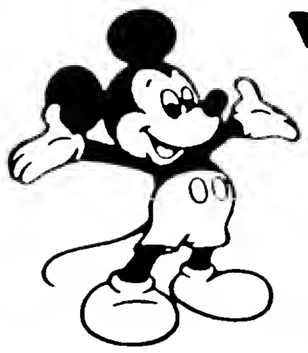

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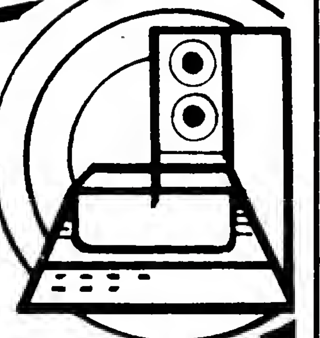

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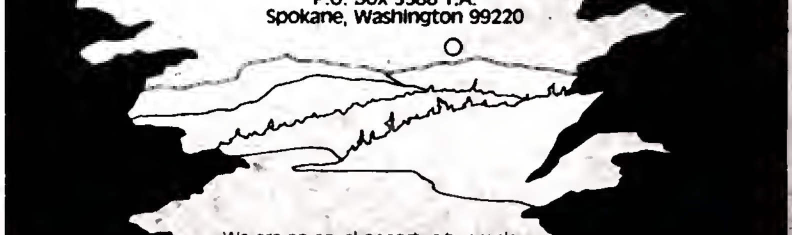

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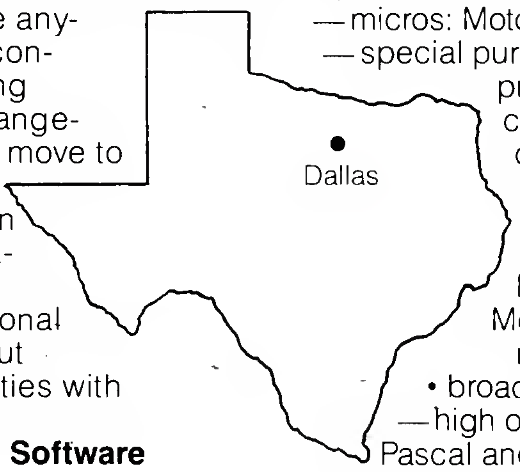

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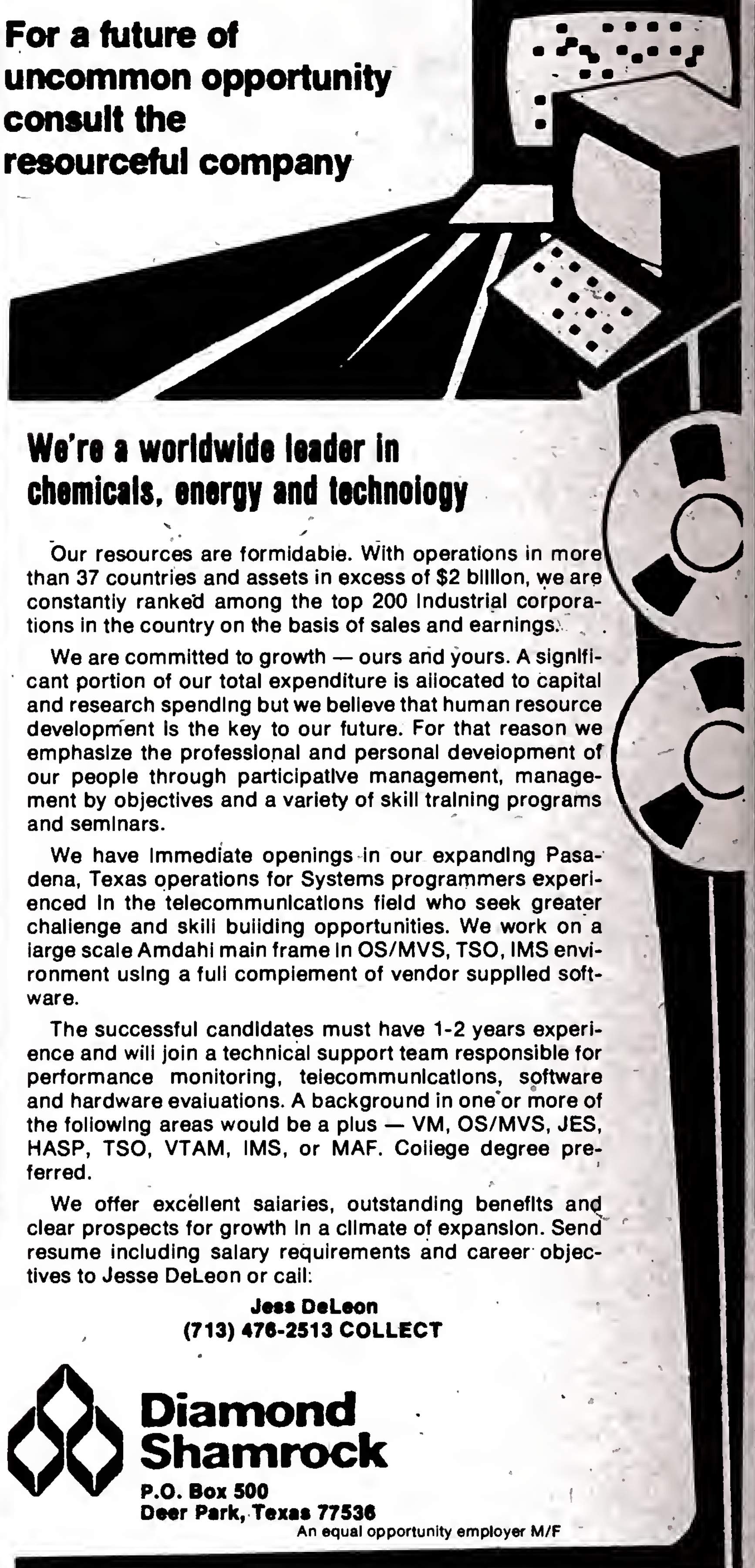

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The World Globe **Monday, May 4, 1981**

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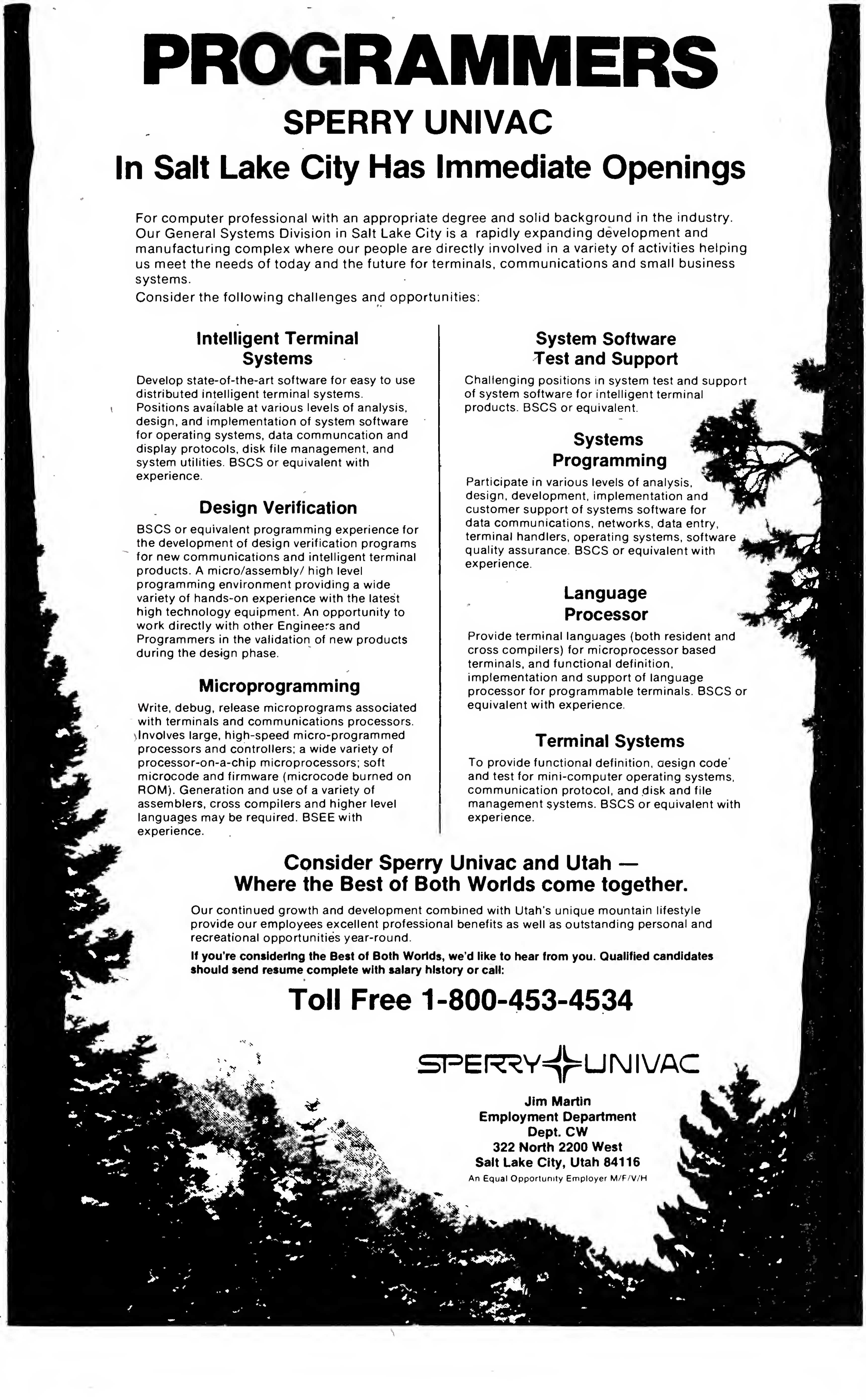

PROGRAMMERS

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Systems Programming

Participate in various levels of analysis, design, development, implementation and customer support of systems software for data communications, networks, data entry, terminal handlers, operating systems, software quality assurance. BSCS or equivalent with experience.

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- Data Base Management Systems
- Manufacturing and/or Accounting Applications
- On-Line Systems

PROGRAMMER/ANALYST
Process Control

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- COBOL, BASIC and FORTRAN
- Real-Time Interactive Applications
- HPIB (IEEE 488) Interface

PROGRAMMER/ANALYST
Computer Aided Design

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SYSTEMS PROGRAMMER
MVS/JES2, ACF/VTAM, ACF/NCP

We have a position for an individual with a minimum of 2 years experience in the installation, maintenance and tuning of MVS/JES2 and associated software.

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data processing

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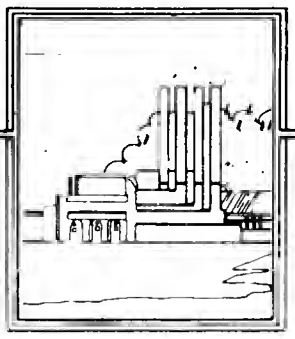

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The qualified applicant should have a minimum of 5 years managing a development staff in a scientific or graphics environment with responsibility for planning, operating budgets and scheduling. A degree in Computer Science, Math, Physics or Engineering with some formal management training is desired.

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A minimum of 5 years, managing a Manufacturing and Field Service Division in a computer related industry with responsibility for the manufacturing, installation, maintenance of equipment, as well as the training of clients on the product, is required. The qualified applicant should have a B.S. or A.S. degree in Engineering or Electronics with some formal management training.

If you qualify for either position, consider this opportunity and send your resume and salary history in confidence to: John Wright Synercom Technology, Inc., 500 Corporate Dr., Sugar Land, Texas 77478. (713) 491-5000.

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Come Meet Tektronix at NCC

We are a Fortune 500 Corporation engaged in the development, manufacture and marketing of Computer Graphic Systems. Our position as the industry leader allows us to currently offer career positions in our sales offices with excellent opportunities for personal contribution, responsibility and growth. We are looking for leaders in **your** field in the following areas:

Sales Support

If you have good communication skills and your experience has been in pre/post sales support in a data processing environment, we'd like to talk to you about a **Tektronix** career as a Systems Analyst.

Technical Sales

We seek experienced sales engineers with proven success in computer sales. You should have clear goals and a desire for outstanding career growth in a company that has more than doubled in sales during the past five years.

If you're going to the NCC . . .

Call us for an appointment to discuss these positions or drop by our NCC booth and/or visit our recruiting suite at:

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Chicago, Illinois
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Monday through Thursday, May 4-7, 9AM - 5PM

Tektronix
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If we can't meet you at the NCC, please direct your resume to **Roy Bauerle, 3003 Bunker Hill Lane, Santa Clara, CA 95050** or call **(800) 538-8125. In California, call collect (408) 496-0800.** We are an equal opportunity employer m/f/h.

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position announcements | position announcements

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If you are, STC Computer Research Corporation has unsurpassed ground floor opportunities for you. You'll be joining a team of top professionals with proven track records who are chartered with the Engineering and Development of a high performance mainframe computer. And the operation is affiliated with Storage Technology Corporation (STC), a large and successful Fortune 500 manufacturer of computer peripherals.

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Seeking BS/MSEE with 5+ years' related Logic Design and Mainframe Development experience in any of the following areas:

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Seeking BS/MSEE with 2-5 years' Logic and Hardware Design experience.

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BS and 3-5 years' development experience of design tools or gate-array physical layout software. IBM-370 preferable.

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BS and 3-5 years' design and implementation of File Management System for design data base.

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Ad closing is every Friday, 10 days prior to issue date.

Rates: Open rate is $84.70 per column inch. Columns are 2″ wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $169.40 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

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William J. Mills,
Manager
Classified Advertising

Our Travelers Cheque Division Is Doing A Little Traveling.

The Systems and Data Processing Department of our Travelers Cheque Division is headed west. Due west, to the great, open expanses of Salt Lake City!

Our growth rate has necessitated several major, new computer and communications systems enhancements which will make ours the most advanced communications/operations center in the industry. Changes of this magnitude necessitate building a totally new facility, and Salt Lake City, with its unique blend of cultural, recreational and educational facilities, has been chosen.

The priority of this new center will be meeting customers' needs more quickly, more effectively. Consequently, approximately 80% of the projects will be developmental in nature. The primary functions of the Systems and Data Processing Department will be systems development, IMS data base administration, advanced technology, systems assurance and planning, computer operations and technical support in a 303X, MVS/SP, IMS, DB/DC environment. To successfully carry out these responsibilities, we'll need developmentally-oriented data processing professionals who enjoy the challenge of implementing new technologies. Some positions will initially be based in New York City, with relocation to Salt Lake City mid-1982. Specifically, we're looking for:

- **PROGRAMMING SYSTEMS CONSULTANTS**
- **PROJECT LEADERS**
- **SYSTEMS ASSURANCE PROFESSIONALS**
- **DATA BASE SPECIALISTS**
- **SYSTEMS ANALYSTS**
- **PROGRAMMER/ANALYSTS**
- **SOFTWARE PROGRAMMERS**

If you have the spirit of adventure, if you're ready to work for a large international company, join the westward movement. We'll offer you an excellent salary and comprehensive benefits, plus the opportunity to really grow with our all-new operation.

To learn more about our plans for the future and how you fit into the picture, send your detailed resume, including salary history and requirements, in confidence to: American Express Company, Travelers Cheque Division, Personnel Dept CW54, 7th flr, 125 Broad St., N.Y., N.Y. 10004. We are an equal opportunity employer m/f.

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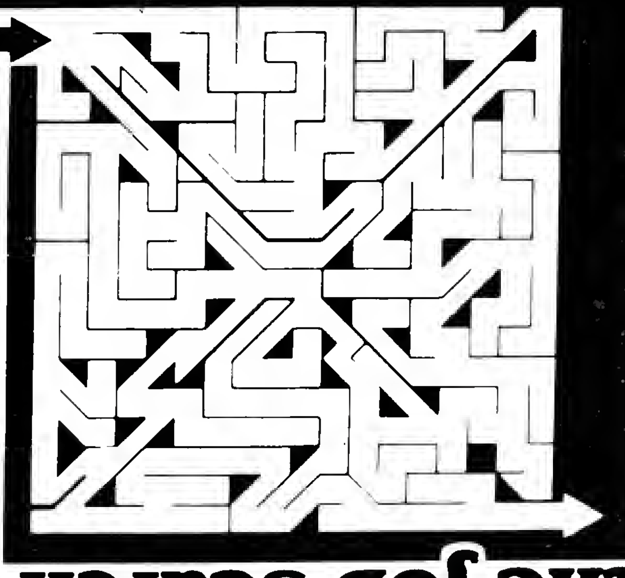

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Will be involved in computer service project feasibility and cost analysis, and project guidance and support in a multi-divisional data communications environment. Requires 7 years' experience with minicomputers, mainframes, teleprocessing, and computer systems development. BSIE (or equivalent) is desirable, as is a knowledge of communications.

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Develop new systems and provide ongoing user support for engineering, materials management, and project management. Requires a degree and at least 5 years' experience, with emphasis on on-line database system applications in an Engineering or Manufacturing environment.

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Our data base network has grown so much that we're establishing a Los Angeles Support Project to provide resident IMS expertise for Southern California. We need experienced senior-level technical consultants and IMS/MVS systems programmers.

This ground floor project presents you with IMS career opportunity that's hard to beat. You'll have the resources to fine tune systems and set the tone for the entire L.A. IMS operation. Your objective is to create a compatible IMS-MVS-SNA environment utilizing IMS FASTPATH, MSC, ACF/VTAM and ACF/NCP for on-line processing.

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We offer competitive salaries and benefits, excellent training facilities and the latest in systems development methodologies. If you have the qualifications and vision, Pete Hill, Thomas Work or Chris Skeadas would like to talk to you. To arrange a local interview with one of them, please call Spencer Allen collect at 415/953-4135. Or send your resume to Bank of America, Dept. 3411-L, P.O. Box 37000, San Francisco, CA 94137. We are an equal opportunity employer.

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DATA PROCESSING

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Mellonics is a major computer service company, located in the San Fernando Valley, just 27 miles from Los Angeles. We are continually expanding our Data Processing Services and maintain the very latest IBM equipment, creating a state-of-the-art environment. If you are qualified and experienced in any of the following areas, we invite you to explore the diversified and challenging career opportunities currently available interfacing with IBM 370 & 3033, OS-MVS.

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B.S. degree in Business, Math, or Computer Science plus six years of equivalent Systems Analyst experience. An equivalent combination of education and experience is acceptable. Must be able to work on all phases of Systems Analyst functions and have demonstrated ability to work well with user departments.

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You may know that **Tektronix** has recently announced a new sales organization for our growing family of Universal Microprocessor Development and Logic Analysis systems. Our recruiting activities for this exciting new sales organization will commence at NCC and this is an invitation to capitalize upon a truly unique career opportunity available in one of many U.S. locations.

If you have sales and/or sales management experience in the microprocessor or microcomputer industries, we would like to discuss our opportunities with you. The products you will be involved with are solidly established in the fast growing Microprocessor Design and Logic Analysis markets, and we are also very excited by the array of new products soon to be announced. We invite you to join in our excitement by stopping by our NCC display or visiting our recruiting suite at:

The Holiday Inn, Midcity Plaza
One South Halsted
Chicago, Illinois
(312) 829-5000
Monday through Thursday, May 4-7, 9 AM-5 PM

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If you are unable to attend NCC or would like more information about this GROUND FLOOR OPPORTUNITY, please call or send your resume to **Kathy Curry, Tektronix, Inc., 3003 Bunker Hill Lane, Santa Clara, CA 95050 (800) 538-8125. In California, call collect (408) 496-0800.**

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Please do not phone.
For a confidential, local interview, send your resume including work experience, salary requirements and personal data to:

Oasis Oil Company of Libya, Inc.
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WAITING FOR YOUR SHIP TO COME IN? LOOK FOR IT ON THE SAN FRANCISCO HORIZON!

There are over 600 openings in our data bank for the San Francisco Bay Area alone. If you're interested in one of them, nobody can give you more help than we can. Here are some of the things you should consider.

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Opportunities are also available in other cities, through our 25 affiliate firms. OUR CLIENT COMPANIES PAY ALL FEES. INTERVIEW, AND RELOCATION EXPENSES. Send us your resume today or call collect, Computer Resources Group, Inc., 303 Sacramento Street, San Francisco, CA 94111, (415) 398-3535, or 3333 Bowers Avenue, Suite 130, Santa Clara, CA 95051, (408) 727-1658.

For May 6, 7, or 8 NCC Appts., contact Larry Goldfarb at our S.F. office or call him at 312-836-0100 in Chicago, The Marriott Hotel, 540 N. Michigan Ave

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For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.

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For sincere personal service, please send a confidential resume to:

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MVS-SYSTEMS PROGRAMMERS

AMPEX is a world leader in the design and manufacture of professional audio and video tape recording equipment. At AMPEX we house the latest state-of-the-art equipment in a stimulating atmosphere of creativity and professionalism. We start with top data processing professionals and work with them to further upgrade and advance their skills in the exciting world of data processing. At AMPEX, our emphasis is on personal career development.

Our technical environment consists of: large MVS 370 as the hub of an SNA network of DOS/VSE 4300s: MVS, JES 2, TSO, IMS, CICS, ACF/VTAM, ACF/NCP and data dictionary.

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Located in the easily accessible South San Francisco Bay area, AMPEX offers a highly desirable benefits package, on-site employee recreational facilities and much more. You are encouraged to send your resume today to Danny Norman or call him collect at (415) 367-2103.

AMPEX

Ampex Corporation
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Programmer Analyst

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We offer an excellent benefits package, a salary reflective of your talents, and the potential for professional development within the Corporation. Send resume along with salary history and requirements in confidence to:

Supervisor of Recruiting
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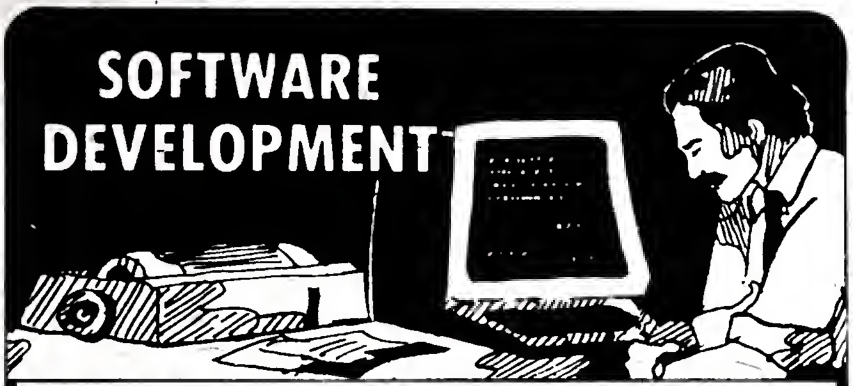

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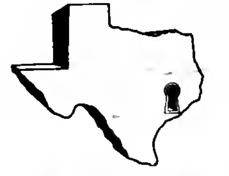

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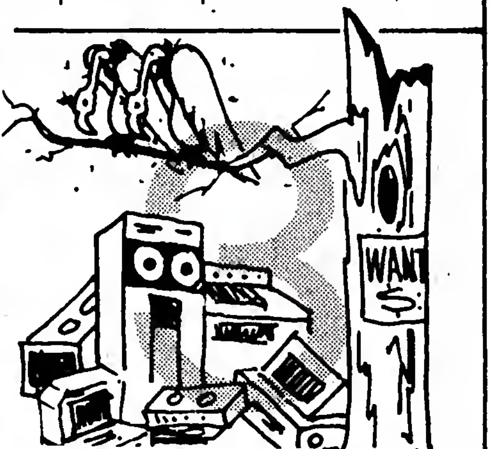

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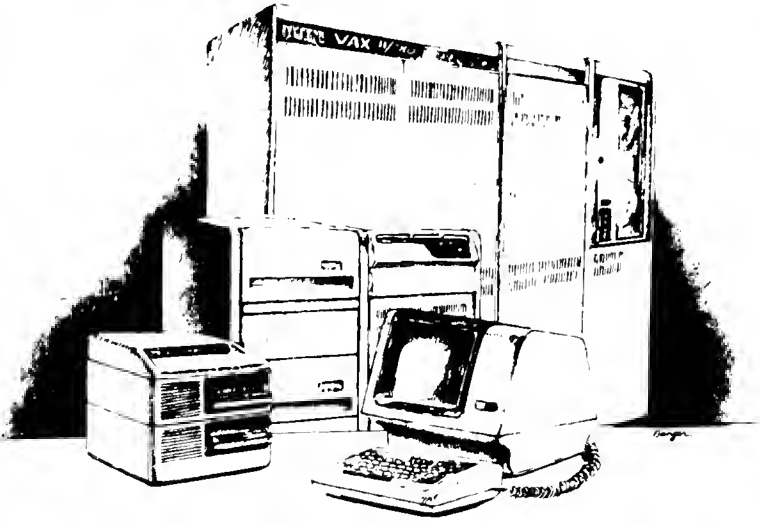

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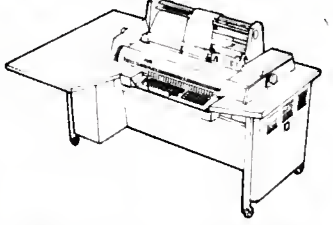

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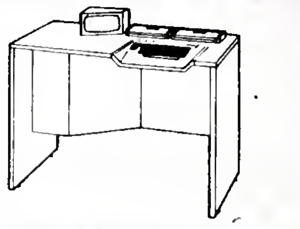

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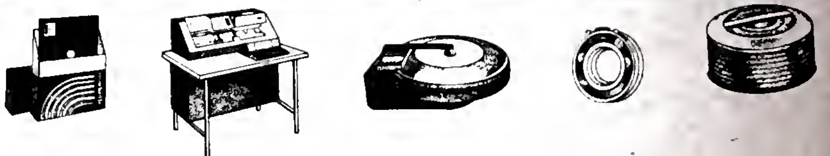

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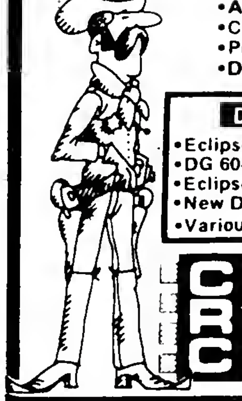

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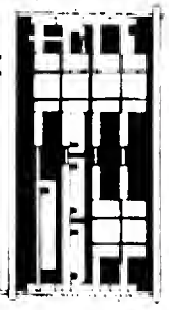

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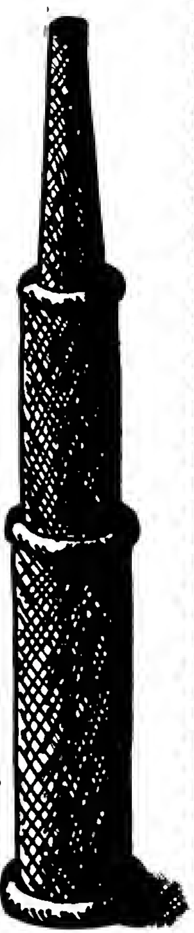

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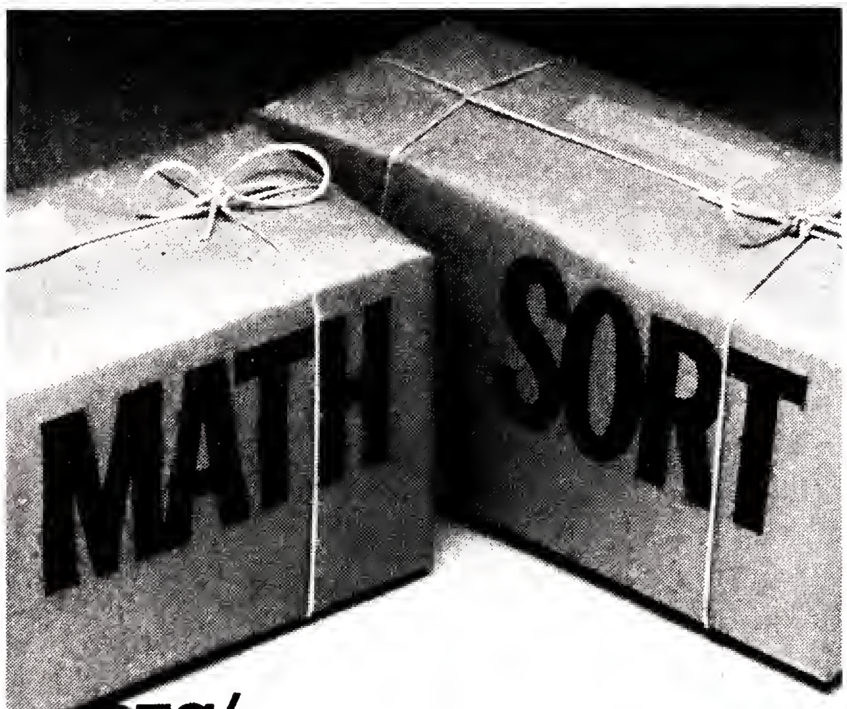

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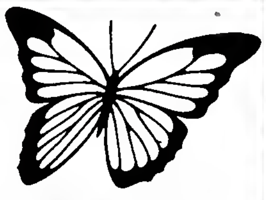

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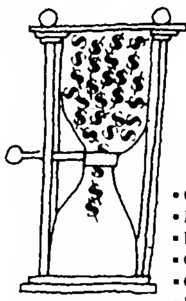

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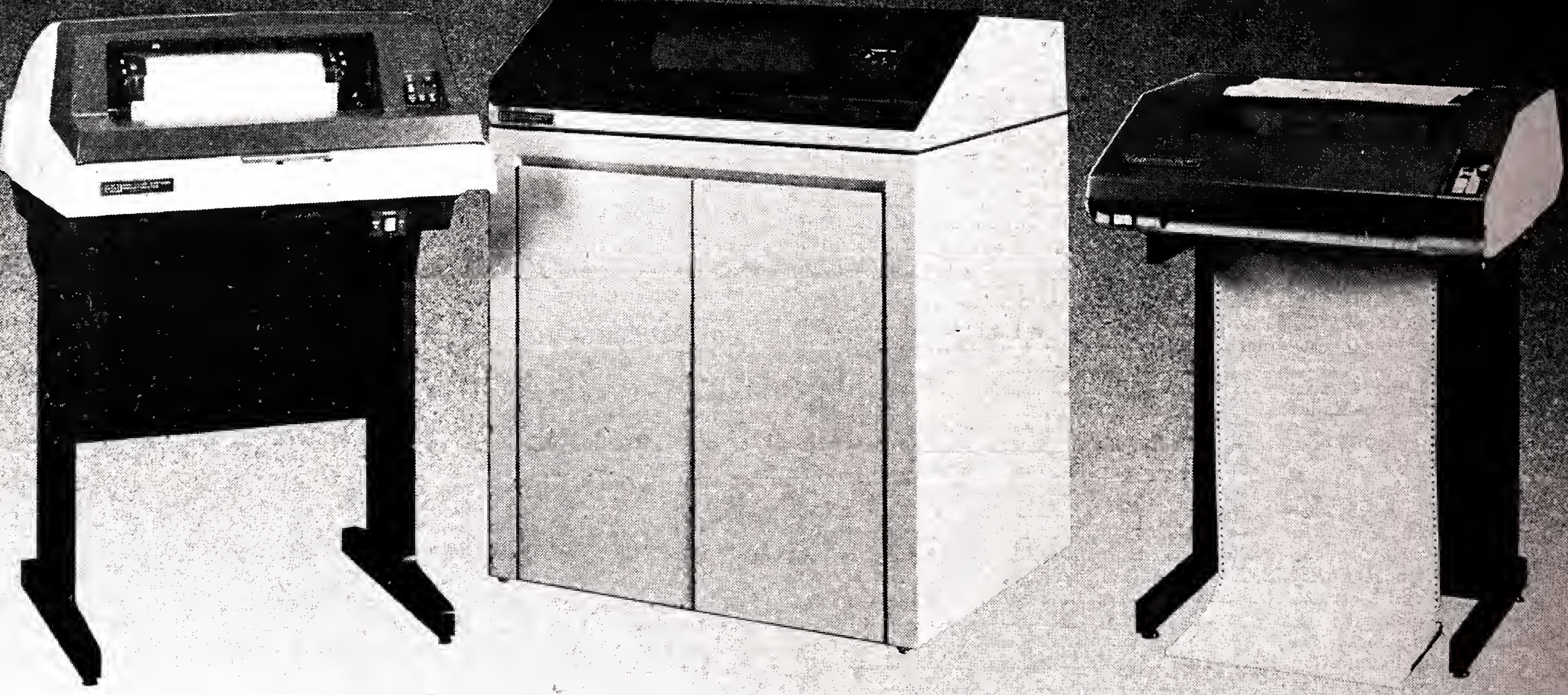

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